MEDIA AND TECHNOLOGY USAGE, ATTITUDES TOWARDS MEDIA, SEX, AND GENERATIONAL STATUS AS PREDICTORS OF MENTAL HEALTH AMONG UNIVERSITY STUDENTS

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STUDENT DECLARATION

I, Natasha Jacoleen Eksteen, hereby declare that the dissertation I submit for the degree Master of Social Science (Clinical Psychology) at the University of the Free State is my personal, autonomous work and that this dissertation has not been submitted previously at/in another university or faculty. Furthermore, I cede the copyright of this dissertation in favour of the University of the Free State.

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Kind regards.

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ABSTRACT

Research has shown that university students are a vulnerable population that faces multiple challenges, especially relating to their mental health. It has become evident that depression, anxiety, and stress are common mental health concerns reported among undergraduate university students. Although various factors contribute to the reported increase in depression, anxiety, and stress, one prominent and concerning factor that has been identified is student's media and technology usage in their daily functioning as well as their attitudes toward media and technology usage. The main objective of this research study was therefore to determine which predictor/independent variable(s) or combination of variables investigated in the current study were responsible for the largest percentage of variance in the mental health (i.e., depression, anxiety, and stress) of undergraduate university students. The predictor/independent variable(s) that were investigated includes media and technology usage, attitudes towards media, sex, and generational status of students. Moreover, the differences in mental health of undergraduate university students with regards to sex (male vs female), and generational status (first-generation vs non-first-generation) were also investigated in the study. This study used a quantitative research approach along with a non-experimental research type. Moreover, a cross-sectional correlational research design was used to investigate the relationship between the different dependent and independent variables. An existing data set of a research project was used in the study. The sample included 1191 undergraduate university students, between the ages of 18 and 29 years old, from the Faculty of the Humanities at the University of the Free State (UFS), Bloemfontein, South Africa. The study made use of the *Depression, Anxiety, and Stress Scale* (DASS) and the *Media and Technology Usage and Attitudes Scale* (MTUAS) to measure the students' mental health and media and technology usage as well their attitudes towards media and technology respectively. The results from the hierarchical regression analyses indicated that

the combination of independent (predictor) variables statistically significantly predicted Depression and Anxiety respectively, with both findings indicating medium practical significance. The results of the stepwise regression analyses conducted indicated that five of the nine independent variables, namely Media Usage for Leisure, Preference for Task Switching, Positive Attitudes towards Media and Technology, Media Anxiety/Dependence, and Media Usage for Communication in combination statistically significantly contributed to 12.2% of the total variance in Depression. Moreover, five of the nine independent variables, namely Media Usage for Leisure, Preference for Task Switching, Positive Attitudes towards Media and Technology, Media Anxiety/Dependence, and Media Usage for Communication in combination statistically significantly contributed to 13.8% of the total variance in Anxiety. Lastly, five of the nine independent variables, namely Preference for Task Switching, Media Usage for Leisure, Media Anxiety/Dependence, Positive Attitudes, and Negative Attitudes made a statistically significant contribution to the variance of Stress, although the results indicated that these variables, individually or in combination, were of no practical significance.

Keywords: Depression, anxiety, stress, university students, media and technology usage, attitudes toward media and technology, sex, generational status.

ABSTRAK

Navorsing het getoon dat universiteitstudente ’n kwesbare populasie is wat verskeie uitdagings in die gesig staar, veral met betrekking tot hul geestesgesondheid. Dit het duidelik geword dat depressie, angs en spanning algemene geestesgesondheidskwessies is wat voorgraadse universiteitstudente rapporteer. Alhoewel verskeie faktore bydra tot die gerapporteerde toename in depressie, angs en spanning, is een prominente en kommerwekkende faktor wat geïdentifiseer is studente se media en tegnologie gebruik in hul daaglikse funksionering, sowel as hul houdings teenoor media- en tegnologie gebruik. Die hoofdoel van hierdie navorsingstudie was dus om te bepaal watter voorspeller/onafhanklike veranderlike(s) of kombinasie van veranderlikes in die huidige studie vir die grootste persentasie variasie in die geestesgesondheid (dit wil sê depressie, angs en spanning) tellings van voorgraadse universiteitstudente verantwoordelik was. Die voorspeller/onafhanklike veranderlike(s) wat ondersoek was, sluit in media- en tegnologie gebruik, houdings teenoor media en tegnologie, geslag en generasie-status van studente. Verder is die verskille in geestesgesondheid van voorgraadse universiteitstudente met betrekking tot geslag (manlik vs vroulik) en generasie-status (eerste-generasie vs nie-eerstegenerasie) ook in die studie ondersoek. Hierdie studie het ’n kwantitatiewe navorsings benadering gebruik saam met ’n nie-eksperimentele navorsingstipe. Verder is ’n dwarssnit-korrelatiewe navorsingsontwerp gebruik om die verhouding tussen die verskillende afhanklike en onafhanklike veranderlikes te ondersoek. ’n Bestaande datastel van ’n navorsingsprojek was in hierdie studie gebruik. Die steekproef het 1191 voorgraadse universiteitstudente tussen die ouderdomme van 18 en 29 jaar oud ingesluit, van die Fakulteit van die Geesteswetenskappe aan die Universiteit van die Vrystaat (UV) in Bloemfontein, Suid-Afrika. Die Depressie, Angs en Spanningsskaal (*Depression, Anxiety, and Stress Scale*; DASS) en die Media en Tegnologie Gebruiksskaal (*Media and Technology Usage and Attitudes Scale*; MTUAS) is in hierdie studie gebruik om

die geestesgesondheid van die studente sowel as hul media- en tegnologiegebruik en hul houdings teenoor media en tegnologie onderskeidelik te meet. Die resultate van die hiërargiese regressie-analise het aangedui dat die kombinasie van onafhanklike (voorspellende) veranderlikes statisties beduidend depressie en angs voorspel het, met beide bevindings wat medium praktiese betekenis aandui. Die resultate van die stapsgewyse regressive-analise wat uitgevoer was, het aangedui dat vyf van die nege onafhanklike veranderlikes, naamlik Media Gebruik vir Ontspanning, Voorkeur vir Taakskakeling, Positiewe Houdings teenoor Media en Tegnologie, Media Angs/Afhanklikheid, en Media Gebruik vir Kommunikasie, gesamentlik statisties beduidend 12.2% van die totale variansie in Depressie bygedra het. Verder het vyf van die nege onafhanklike veranderlikes, naamlik Media Gebruik vir Ontspanning, Voorkeur vir Taakskakeling, Positiewe Houdings teenoor Media en Tegnologie, Media Angs/Afhanklikheid, en Media Gebruik vir Kommunikasie, gesamentlik statisties beduidend 13.8% van die totale variansie in Angs bygedra. Laastens het vyf van die nege onafhanklike veranderlikes, naamlik Voorkeur vir Taakskakeling, Media Gebruik vir Ontspanning, Media Angs/Afhanklikheid, Positiewe Houdings, en Negatiewe Houdings ’n statisties beduidende bydrae tot die variansie van Spanning gelewer, alhoewel die resultate aangedui het dat hierdie veranderlikes, afsonderlik of gesamentlik, geen praktiese betekenis gehad het nie.

Kernwoorde: Depressie, angs, spanning, universiteitstudente, media- en tegnologie gebruik, houdings teenoor media en tegnologie, geslag, generasie-status.

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CHAPTER ONE

INTRODUCTION AND ORIENTATION TO THE STUDY

1.1. Introduction

This chapter serves as an introduction and orientation to the mini-dissertation in general. The context, rationale, and problem statement will be expanded on in the context of relevant literature, followed by a presentation of the research aim, objectives, and questions. Furthermore, this chapter provides a brief overview of the research methodology relating to this study, including the research design and methods, participants and sampling, data collection and measuring instruments, as well as the data analyses and statistical procedures. The relevant ethical considerations will be discussed along with the significance and value of the study. Important terminology and definitions will then be provided, followed by an outline of the five chapters of the mini-dissertation. Finally, this chapter will conclude with a summary of the chapter.

1.2. Context, Rationale, and Problem Statement of the Study

The mental health of university students is a significant concern both on a national (South Africa) and international level (Auerbach et al., 2018; Lattie et al., 2019; Macaskill, 2013; Schreiber, 2018; Van Der Walt et al., 2020), with previous studies indicating that university students report more mental health concerns compared to the general population (Bantjes et al., 2019; Bantjes, Saal, Lochner et al., 2020; Limone & Toto, 2022). Over the last couple of years, there has been a significant increase in the number of university students experiencing serious mental health challenges such as depression, anxiety, stress, posttraumatic stress disorder (PTSD), eating disorders, suicidality, and self-harm (Campbell et al., 2022; Dessauvagie et al., 2021; Krendl, 2023; Liu et al., 2022; Salimi et al., 2023). Among these disorders, depression, anxiety, and stress are some of the most common mental health concerns reported by university students (Li et al., 2022; Meeks et al., 2021; Salimi et

al., 2023; Van Der Walt et al., 2020; Yu et al., 2022). These mental health challenges and concerns among university students tend to have a direct negative impact on their general well-being, development, life satisfaction, academic performance, attainment of future goals, and occupational success and/or satisfaction (Aldiabat et al., 2014; Bantjes, Saal, Gericke et al., 2020; Bayram & Bilgel, 2008; Lattie et al., 2019).

Moreover, university students fall within the emerging adulthood developmental stage (Arnett, 2015; Balgiu, 2017; Ozkan & Solmaz, 2015). Emerging adulthood is a pivotal developmental period during which individuals explore and form their identity, independence, and autonomy (Lattie et al., 2019; MacLeod & Brownlie, 2014). This life stage is characterised by several changes and a transition not only from secondary school to university life but also changes in their social life, career goals and satisfaction, and specifically their mental health (Arnett, 2000; Lin et al., 2016; Primack et al., 2009; Vaterlaus et al., 2015). This group is likely to face numerous challenges relating to their mental health, especially increased levels of depression, anxiety, stress, and media and technology addiction and dependence (Afifi et al., 2018; Ahmad et al., 2018; Becker et al., 2013; Charles, 2019; Kuppuswamy & Narayan, 2010; Lepp et al., 2014; Primack et al., 2009; Thapa & Subedi, 2018; Thomée, 2018; Thomée et al., 2007; Vaterlaus et al., 2015).

Furthermore, excessive usage of media and technology has been recognised as a risk factor for the reported mental health concerns among university students (Ahmad et al., 2018; Becker et al., 2013; Bickham et al., 2015; Charles, 2019; Lin et al., 2016; Orsal et al., 2013; Pantic, 2014; Primack et al., 2009; Thapa & Subedi, 2018; Thomée, 2018; Thomée et al., 2011). It has been estimated that 90% of university students use social media daily to communicate, share stories, post online, or engage in leisure activities (Ahmad et al., 2018; Gustafsson et al., 2003; Kuppuswamy & Narayan, 2010; Lin et al., 2016). They spend an average of four hours per day on social media (Henderson, 2020; Primack et al., 2009; Thapa

& Subedi, 2018; Vaterlaus et al., 2015). The need to stay connected and close to media and technology has been termed *Technostress* or *ICT stress* due to the physiological arousal experienced as excessive stress when an individual feels unconnected and pressured to be reachable and available (Bickham et al., 2015; Gustafsson et al., 2003; Sansone & Sansone, 2013; Thomée et al., 2007; Thomée et al., 2011). Thus, social media dependence and addiction among university students is a growing concern as it relates to their attitudes toward social media content, usage, and multitasking (Bickham et al., 2015; Chukwuere & Chukwuere, 2017; Lin et al., 2016; Pantic, 2014; Thapa & Subedi, 2018; Thomée et al., 2011), which contributes to the mental health concerns mentioned (Becker et al., 2013; Thaba & Subedi, 2018; Vaterlaus et al., 2015). Although some university students view social media connectedness as beneficial for social support and relationships, these interactions are shallow and inadequate to protect them from mental health concerns such as depression, anxiety, and stress due to the lack of physical interaction where body language, presence, and affection play a vital role (Bickham et al., 2015; Pantic, 2014; Thaba & Subedi, 2018).

Moreover, there seem to be differences between male and female university students regarding their mental health (Afifi, 2007; Coyne et al., 2020; World Health Organization [WHO], 2020). Research has shown that female students are more inclined to experience and report higher levels of stress, anxiety, depression, suicide attempts, and eating disorders, while male students are more inclined to experience and report substance abuse and aggressive outbursts and behaviours (Gao et al., 2020; Gibson et al., 2016; Spagnolo et al., 2020). The reason for these differences could be attributed to the interplay between biological, social, and psychological factors in different biological sexes (Afifi, 2007; Ahmad et al., 2018; Bantjes et al., 2019; Coyne et al., 2020; Gao et al., 2020; Ibrahim et al., 2013; Primack et al., 2009; Schreiber, 2018; Thomée, 2018; Thomée et al., 2011; WHO, 2020). Previous studies also found a correlation between university students' generational status and

their mental health concerns, with first-generation students being more inclined to experience higher levels of stress, anxiety, depression, and feeling overwhelmed in comparison to non-first-generation students (Bantjes et al., 2019; Becerra, 2017; Bostic, 2013; Garriott & Nisle, 2018; Lippincott & German, 2007; Stebleton et al., 2014). This is possibly due to the lack of family support and guidance, financial constraints, and a lack of cultural capital and academic skills (Garriott & Nisle, 2018; Jenkins et al., 2013).

Thus, it is essential to remain cognisant of university students' mental health challenges (Bantjes et al., 2019; Bayram & Bilgel, 2008; Macaskill, 2013). Identifying the possible predictors of mental health among university students could be valuable to enable professionals and stakeholders to intervene timeously and wisely to limit and/or prevent any further decrease in mental health among university students (Bantjes et al., 2019; Bayram & Bilgel, 2008). Therefore, the research problem noted and identified after consulting relevant and available research was the concern of mental health among university students and the variable(s) that could play a predictive role in university students' mental health. Thus, this research study focused on whether media and technology usage, attitudes towards media, sex, and generational status can serve as possible predictor variables of mental health (i.e., depression, anxiety, and stress) among university students. In this study, mental health is the dependent (criterion) variable, while media and technology usage, attitudes towards media, sex, and generational status are the independent (predictor) variables.

1.3. Research Aim and Objectives

This study aimed to determine which variable(s) or combination of variables will explain a significant percentage of the variance of mental health among undergraduate university students. Furthermore, the main objective was to determine which predictor/independent variable(s) investigated in the current study was responsible for the largest percentage of variance in the mental health (i.e., depression, anxiety, and stress)

scores of undergraduate university students at the University of the Free State in Bloemfontein.

1.4. Research Question(s)

In order to address the abovementioned research aim and objectives, the following research questions were investigated:

- Can the combination of media and technology usage, attitudes towards media, sex, and generational status explain a significant percentage of variance in the mental health of undergraduate university students?
- Do any of the individual predictor variables significantly contribute to the variance in the mental health of undergraduate university students?

1.5. Research Methodology

The relevant research methodology employed in this study will be addressed in the following discussion section. This includes the research design and methods, participants and sampling, data collection and measurement scales, as well as the data analyses and statistical procedures utilised.

1.5.1. Research Design and Methods

A quantitative research approach and a non-experimental research type were used since no intervention or manipulation of variables occurred, and participants were not randomly assigned (Stangor, 2015). A cross-sectional correlational research design was used to investigate the relationships between the different dependent and independent variables (Howell, 2017; Stangor, 2015).

1.5.2. Participants and Sampling

An existing data set of a research project was used in this study. Thus, this research study was a secondary analysis of an existing data set. Non-probability sampling, namely convenience sampling, was used in the original research project to recruit participants. The

sample included 1 191 undergraduate university students between 18 and 29 years old from the Faculty of the Humanities at the University of the Free State (UFS), Bloemfontein, South Africa. Undergraduate university students from different biological sexes, ethnic groups, majors, generational statuses, and religious affiliations participated in the project.

1.5.3. Data Collection and Measurement Scales

Undergraduate students from the Faculty of the Humanities at the University of the Free State were invited to participate in the study voluntarily, and they were requested to complete the relevant questionnaires online using the UFS Blackboard online platform.

A *biographical questionnaire* was used to collect demographic data that included but were not limited to biological sex, age, race, ethnicity, main major subjects, religious affiliation, and generational status.

The *Depression, Anxiety, and Stress Scale* (DASS; Lovibond & Lovibond, 1995) was used to measure mental health, more specifically depression, anxiety, and stress. The DASS consists of 42 items measured on three subscales, namely (i) Depression, (ii) Anxiety, and (iii) Stress. These items are rated on a four-point Likert-type scale ranging from 0 ("*Did not apply to me at all*" or "*never*") to 3 ("*Applied to me very much*" or "*most of the time*") (Lovibond & Lovibond, 1995). High scores obtained indicate higher levels of depression, anxiety, and stress. Good to exceptional internal consistencies (Cronbach alphas) ranging from .89 and .94 for the DASS subscales have been reported in previous studies (Akin & Çetın, 2007; Damanik, 2011).

The *Media and Technology Usage and Attitudes Scale* (MTUAS; Rosen et al., 2013) was used to measure the participants' media and technology usage and attitudes towards media and technology. The MTUAS comprises 60 items with 15 subscales, divided into two sections. The first section consists of 11 subscales that measure the frequency of various media and technology usages, namely smartphone usage, general social media usage, internet

searching, e-mailing, media sharing, text messaging, video gaming, online friendships, Facebook friendships, phone calling, and TV viewing (Rosen et al., 2013). The second section, consisting of four subscales, measures the attitudes towards media and technology: positive attitudes toward technology, anxiety about being without or dependent on technology, negative attitudes toward technology, and preference for task switching (Rosen et al., 2013). The media and technology usage items are rated on a ten-point Likert-type scale that ranges from 1 ("*never*") to 10 ("*all the time*"). For this study, the 11 media and technology usage subscales were grouped into three dimensions: (i) Media Usage for Social Engagement (MUSE), (ii) Media Usage for Communication (MUC), and (iii) Media Usage for Leisure (MUL), as was done in previous studies (Cronje, 2019; Maoela, 2022; Nel, 2021; Van Tonder, 2020; Van Tonder et al., 2023). The attitudes items are rated on a five-point Likert-type scale ranging from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). Higher scores on the usage subscales indicate higher frequency in media and technology usage. Higher scores on the attitude subscales indicate either more positive attitudes toward media and technology, higher preferences for task switching, or higher levels of anxiety or dependence toward media and technology (Rosen et al., 2013). Adequate to good internal consistencies (Cronbach alphas) ranging between .71 and .89 have been reported for all the subscales of the MTUAS (Cronje, 2019; Özgür, 2016; Van Tonder, 2020). The internal consistencies (Cronbach alphas) for the three dimensions used ranged from .88 to .95 (Cronje, 2019; Maoela, 2022; Nel, 2021; Van Tonder, 2020; Van Tonder et al., 2023).

1.5.4. Data Analyses and Statistical Procedures

The Statistical Package for Social Sciences (SPSS, Version 29; IBM Corporation, 2023) was used to analyse the data. Cronbach alphas were used to determine the internal reliability of the relevant measuring instruments. Descriptive data of the sample and the relationship between the variables were determined. Pearson correlation coefficients were

calculated to investigate the strength, direction, and significance of the correlations or relationships between the variables (Stangor, 2015).

Moreover, hierarchical multiple regression analyses were conducted to determine which variable(s) or combination of variables contribute to a significant percentage of variance in the mental health of undergraduate university students. Hierarchical multiple regression analyses were used to examine, explain, or predict the dependent variables using a set of independent variables (Petrocelli, 2003).

1.5.5. Ethical Considerations

Secondary data analyses of an existing data set were conducted in this study. Ethical clearance for the original research project, "*Predictors of psychological well-being amongst university students*", was obtained with ethics number UFS-HSD2017/1313. Ethical clearance for the current study was also obtained from the General and Human Research Ethics Committee (GHREC) at the University of the Free State (Ethics number: UFS-HSD2021/1785). Regarding the initial data collection, the participants' confidentiality and beneficence and non-maleficence principles were adhered to during the initial data collection to avoid any possible harm to the participants (Allan, 2015). In the original study, informed consent was obtained after informing participants that the study was anonymous and voluntary and that the participants could withdraw from the research project at any stage (see Appendix C). The participants' identities were kept anonymous. This was effected by using a coding system and protecting this data through a password-protected document to which the researcher(s) had exclusive access. Permission was also obtained to store and report the data anonymously. Student Counselling and Development Services at the UFS were available if any of the participants experienced distress due to the research project.

1.6. Value and Significance of Study

This study is valuable as it could add to the existing pool of knowledge on a controversial matter that affects undergraduate university students, who are a vulnerable and important part of the population as they are the future of our world (Torii & O'Connell, 2017). Mental illness among university students is a growing area of concern (Charles, 2019). It is steadily increasing and affecting their daily lives and functioning, justifying the need for more extensive research on the current topic and variables.

This study could, therefore, add value to the psychological profession by empowering the profession and the population with information about the possible predictors of mental health among university students with specific reference to media and technology usage since its presence and influences in our future are inevitable and steadily increasing. Lastly, this study adds value to factors, variables, and dynamics that might be considered in possible implementation strategies and preventative measures to protect and improve students' mental health.

1.7. Terminology and Definitions

In order to avoid misunderstanding or confusion, definitions and/or explanations of some of the important terminology used in this study are provided.

1.7.1. Emerging Adults

Emerging adulthood refers to the critical developmental stage in an individual's life course (Wood et al., 2017) that falls within the age range of 18 to 29 (Arnett, 2015). The current study focused mainly on undergraduate university students in the emerging adulthood developmental stage.

1.7.2. Mental Health

The World Health Organization (WHO) defines mental health as "a state of well-being in which the individual realises his or her own abilities, can cope with the normal

stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (WHO, 2004, p. 10). In the current study, mental health is the criterion or dependent variable that includes three sub-variables, namely depression, anxiety, and stress. Mental health, more specifically, depression, anxiety, and stress, was measured with the *Depression, Anxiety, and Stress Scale* (DASS) (Lovibond & Lovibond, 1995).

1.7.3. Media and Technology Usage

Media and technology usage is a broad term encompassing various technological devices and media platforms or applications. However, the current study specifically explored the following activities: smartphone use, general social media usage, internet searching, e-mailing, media sharing, text messaging, video gaming, online friendships, Facebook friendships, phone calling, and TV viewing (Rosen et al., 2013).

1.7.4. Attitudes towards Media and Technology

Attitudes toward media and technology refer to participants' views, perspectives, or general attitudes towards the use and the role of media and technology in their lives. This study considered four attitudes: positive attitudes towards media and technology, media and technology anxiety/dependence, negative attitudes towards media and technology, and preference for task switching (Rosen et al., 2013).

1.7.5. Biological Sex

Biological sex refers to the physical sex assignment of the participants, which includes either male or female (Newman, 2018). Therefore, in this study, sex only refers to being a male or female regarding biological sex, not gender preferences or identifications.

1.7.6. Generational Status

This study distinguished between first-generation students and non-first-generation students. There are various definitions of a first-generation student. However, for the current study, first-generation students refer to those students who received a tertiary education but

whose parents did not (Toutkoushian et al., 2018). Non-first-generation students refer to students with one or both parent(s) who previously received tertiary education and training (Toutkoushian et al., 2018).

1.8. Outline of the Chapters

This study consists of five chapters that address and discuss the following:

1.8.1. Chapter One

The first chapter provided an overview and orientation to the study. The context, rationale, and problem statement were outlined, followed by the research aim, objectives, and research questions this study aimed to answer. Thereafter, the research methodology was discussed, including the research design and methods, participants and sampling, data collection and measurement scales, data analyses, and statistical procedures. Finally, the chapter expanded on the value and significance of the study and the important terminology and definitions.

1.8.2. Chapter Two

Chapter Two will provide a general, yet critical, overview of national and international literature concerning the mental health of university students, along with possible predictors (i.e., media and technology usage, attitudes toward media and technology, sex, and generational status) of mental health (depression, anxiety, and stress) within the university student population.

1.8.3. Chapter Three

This chapter will thoroughly discuss the research methodology used in this study. It includes the research approach, design, and methods employed. Furthermore, this chapter will address the research sample, data collection procedures, data analyses, and an elaboration on the measurement scales used. The chapter will conclude with ethical considerations and a summary of the chapter.

1.8.4. Chapter Four

The results obtained in this study will be presented in Chapter Four. Chapter Four will include an outline and discussion of the descriptive statistics of the research sample, the internal consistencies of the measurement scales, the correlations between the variables, and the hierarchical and stepwise regression analyses conducted.

1.8.5. Chapter Five

In Chapter Five, the results presented in Chapter Four will be elaborated on and discussed in the context of relevant research. A presentation of the limitations of the studies and recommendations for future studies will follow this discussion. This chapter will conclude this mini-dissertation.

1.9. Summary of Chapter

This chapter provided an overview and orientation on what this mini-dissertation entails and what can be expected in the following chapters. Importantly, the mental health of university students has been introduced, as well as the predictor variables that were considered relating to university students' mental health (i.e., depression, anxiety, and stress). The first section of the chapter provided an orientation of the relevant context and the rationale for the study. Also, it addressed the research aim, objectives, and questions the study aimed to answer. A discussion on the applicable research methodology, which incorporated relevant ethical considerations, was also provided. An elaboration on the value and significance of the study was provided, followed by the important terminology and definitions to be noted at the advent of the mini-dissertation. Finally, a brief outline was provided for each of the five chapters of this mini-dissertation.

CHAPTER TWO

LITERATURE REVIEW

"The media has enormous power. The media is undergoing huge changes now. It seemed like it's time to step back and look at how the media shapes our lives and our perceptions of reality." Thomas Hunt Morgan, 2014

2.1. Introduction

This chapter provides a general overview of national and international literature concerning the mental health of university students, including possible predictors of mental health within this population. The independent predictor variables investigated include media and technology usage, attitude towards media, sex, and generational status. The dependent variable investigated was mental health (i.e., depression, anxiety, and stress). First, this chapter will explore mental health within the general population before focusing specifically on mental health concerns among university students. Subsequently, the university student population will be discussed, elucidating relevant aspects related to university students as the population of focus. The role of media and technology usage in the lives of university students will then be addressed, followed by an analysis of the impact thereof on university students' mental health, more specifically, their impact on university students' levels of depression, anxiety, and stress. This chapter will also explore and discuss other relevant predictor variables of mental health amongst university students: students' attitudes towards media and technology usage, sex, and generational status (i.e., first-generation students vs continuous-generation students). The chapter will conclude with a South African perspective and a general summary of the chapter.

2.2. Mental Health

The escalating prevalence of mental health concerns (mental illness) on a global scale has become a major area of concern (Bucci et al., 2019; Foulkes & Andrews, 2023; Ritchie &

Roser, 2018). The WHO defines mental health as “a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (Galderisi et al., 2015, p. 231; WHO, 2004, p. 10). Galderisi et al. (2015) have proposed a comprehensive and culturally neutral definition of mental health, characterising it as:

> … a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society. Basic cognitive and social skills, ability to recognise, express and modulate one’s own emotions, as well as empathise with others, flexibility and ability to cope with adverse life events and function in social roles, and harmonious relationship between body and mind represent important components of mental health which contributes, to varying degrees, to the state of internal equilibrium. (Galderisi et al., 2015, p. 232)

The American Psychiatric Association (APA) refers to mental illness collectively as all diagnosable mental conditions or disorders that include significant changes in an individual’s thinking, emotions, and/or behaviour as well as distress or problems in the individual’s functioning in their social, work and/or family domain and includes anxiety, depression, and stress (APA, 2022b). Mental illness constitutes 13% of the global disease burden worldwide (Jones & Vigo, 2023; Meffert, 2021). A comprehensive meta-analysis by Dragioti et al. (2022) indicated an escalating prevalence of mental illness globally since 2020, specifically increased instances of stress, anxiety, depression, sleep problems, and posttraumatic stress symptoms. McGrath et al. (2023) highlighted that by approximately age 75, half the population is likely to or can be expected to develop a mental disorder. Furthermore, the lifetime prevalence of mental disorders is generally reported as 28.6% for females and 29.8% for males (McGrath et al., 2023).

The most recent statistics provided by the National Institute of Mental Health (NIMH) highlight emerging adults aged 18 to 25 as the most affected group challenged with mental illness (NIMH, 2023), especially notable among university students (Brown, 2016; Lattie et al., 2019; Sheldon et al., 2021). The mental health of university students remains a significant concern both in South Africa and worldwide (Auerbach et al., 2018; Bantjes et al., 2019; Esmaeilimotlagh et al., 2018; Lattie et al., 2019; Macaskill, 2013; Schreiber, 2018; Van Der Walt et al., 2020) since research suggests that university students report more mental health concerns compared to the general population (Bantjes et al., 2019; Bantjes et al., 2020; Limone & Toto, 2022). Also, they are identified as high-risk individuals for mental health problems (Sheldon et al., 2021).

Over the last couple of years, there has been a significant increase in the number of university students experiencing serious mental health challenges and symptoms (Abrams, 2022; American College Health Association [ACHA], 2022). Lipson et al. (2022) found that more than 60% of university students from 2020 to 2021 met the criteria for at least one mental disorder. These statistics were also confirmed in a study by Limone and Toto (2022) that identified mental illness to be the most common in the student population, with more than half of the total student population reporting depression and/or anxiety symptoms or disorders. The most common mental health problems generally reported amongst university students include but are not limited to depression, anxiety, stress, posttraumatic stress disorder (PTSD), eating disorders, suicidality, and self-harm (Abrams, 2022; Auerbach et al., 2018; Bantjes et al., 2019; Limone & Toto, 2022; Mabasa, 2018; Schreiber, 2018; Udhayakumar & Illango, 2018; Van Der Walt et al., 2020). However, some of the most prevalent of these generally identified disorders among university students are depression and anxiety (Bayram & Bilgel, 2008; Ibrahim et al., 2013; Limone & Toto, 2022; Storrie et al., 2010; Van Der Walt et al., 2020). Depression has been identified as the leading non-fatal

disability illness, not only in the world (Lin et al., 2016; Primack et al., 2009; WHO, 2020) but specifically among undergraduate university students (Bayram & Bilgel, 2008; Ceyhan et al., 2009; Ibrahim et al., 2013).

These mental health concerns tend to have a direct negative impact on students' development, life satisfaction, well-being, academic performance, attainment of future goals, and occupational success and/or satisfaction (Aldiabat et al., 2014; Bantjes et al., 2020; Bayram & Bilgel, 2008; Lattie et al., 2019; Lister et al., 2021). It is, therefore, essential to remain cognisant of university students' mental health challenges and the impact thereof on a variety of domains and functioning (Bantjes et al., 2019; Bayram & Bilgel, 2008; Macaskill, 2013). Identifying the possible predictors of mental health among university students could be valuable to enable professionals to intervene timeously and wisely to limit the impact thereof (Bantjes et al., 2019; Bayram & Bilgel, 2008).

Thus, this research study investigated whether media and technology usage, attitudes towards media, sex, and generational status can serve as possible predictor variables of mental health (i.e., depression, anxiety, and stress) among undergraduate university students. In this study, mental health was the dependent (criterion) variable, while media and technology usage, attitudes towards media, sex, and generational status were the independent (predictor) variables.

2.3. University Students (as Emerging Adults) and their Mental Health

The mental health and well-being of university students have become a field of both interest and concern, nationally (South Africa) as well as internationally (Auerbach et al., 2018; Bantjes et al., 2019; Esmaeilimotlagh et al., 2018; Lattie et al., 2019; Macaskill, 2013; Schreiber, 2018; Van Der Walt et al., 2020). Most undergraduate university students are in the emerging adulthood developmental phase, ranging from ages 18 to 29 (Arnett et al., 2014; Balgiu, 2017; Ozkan & Solmaz, 2015). Emerging adulthood is a pivotal developmental

period during which individuals explore and form their identity, independence, and autonomy (Lattie et al., 2019; MacLeod & Brownlie, 2014). This developmental stage is characterised by several changes, especially a challenging transition from secondary school to university life, as well as changes in their mental and physical health, social life, career goals, and career satisfaction (Arnett, 2000; Limone & Toto, 2022; Lin et al., 2016; Primack et al., 2009; Vaterlaus et al., 2015).

Thomas et al. (2019) identified the transition from school to university life as a challenging and demanding period for students that can have deleterious effects on their mental health and general well-being (Bantjes et al., 2019; Thompson et al., 2021). Some of the challenges that university students face concerning the transition to the higher education system include relocating from their familiar home environment, coping with the pressures of adapting to a new social environment and making new friends, financial and/or academic pressure, increased opportunities, and increased peer pressure to engage in substance abuse (Bantjes et al., 2019; Thompson et al., 2021). These factors are only some of the contributing factors leading to an increase in reported stress, anxiety, depression, insomnia, and attentional control difficulties, among others (Afifi et al., 2018; Ahmad et al., 2018; Becker et al., 2013; Charles, 2019; Kuppuswamy & Narayan, 2010; Lepp et al., 2014; Limone & Toto, 2022; Lister et al., 2021; Lovell et al., 2015; Nurudeen et al., 2022; Primack et al., 2009; Thapa & Subedi, 2018; Thomée, 2018; Thomée et al., 2007; Vaterlaus et al., 2015).

Literature suggests that university students not only report more mental health concerns compared to the general population (Bantjes et al., 2019; Bantjes et al., 2020; Lattie et al., 2019; Makhubela, 2021) but also find themselves in a developmental phase where they are vulnerable and prone to developing mental illness (Campbell et al., 2022; De Doncker & McLean, 2022). Factors that contribute to university students' vulnerability to mental illness include, but are not limited to, increased work or academic demands, higher expectations

from them, increased independence with decreased social and emotional support, financial responsibilities and demands, including changes and adjustments to their usual routines and living and social environments as well as a low tendency to seek professional psychological support and assistance (Campbell et al., 2022; Westberg et al., 2022).

It must be noted that university students might already be facing challenges with their mental health when entering the university setting (Greenleaf Walker, 2022; Lovell et al., 2015), possibly exacerbated by multiple factors during their university years, such as stressful and demanding university curriculums, decrease in physical activity (repetitive strain syndrome or RSS), unhealthy eating habits, substance abuse, excessive media and technology use, and general challenges in adjustment (Pedroza, 2017; Thomas et al., 2019). These challenges and additional stressors can either exacerbate existing psychological stressors and symptoms or mark the onset of psychological symptoms and/or possible disorders (Bantjes et al., 2019; McLafferty et al., 2017).

A world mental health survey conducted in 2016 by the WHO across 21 countries indicated that 20.3% of university students had a psychiatric disorder, mainly depression and anxiety (Auerbach et al., 2016; WHO, 2023b). A South African study consisting of 29,000 participants spread over 19 universities found that an estimated 20% of the students indicated poor mental health with the need for mental health support, assistance, and intervention (Greenleaf Walker, 2022). Statistics of the specific diagnoses present amongst the student participants were also provided, with 15.4% experiencing major depression disorders, 10.9% generalised anxiety disorders, 7.2% panic disorders, and 1.8% bipolar mood disorders (Greenleaf Walker, 2022). With regards to suicide rates among these students, 8.6% indicated they have already made suicide plans, with 2.3% disclosing they have had a suicide attempt (Greenleaf Walker, 2022). In another systematic review study by Sheldon et al. (2021), the

prevalence of depression among 13,790 university students was 25%, and 14% for suicide-related behaviour in 2 586 student participants.

In a national survey conducted by Bantjes et al. (2023) across 17 universities in South Africa, with a sample size of 28,516 undergraduate university students, additional insights were gained into the range of mental health problems and concerns among undergraduate university students in South Africa as well as disparities across the different universities involved in the survey (Bantjes et al., 2023). This study indicated that 53.3% of the sample screened positive for at least one psychological disorder (Bantjes et al., 2023). The disorders with the highest prevalence among the student sample were social anxiety disorder at 24.5%, posttraumatic stress disorder at 21.0%, major depressive disorder at 15.4%, attention-deficit and/or hyperactivity disorder at 21.0%, and eating disorders at 22.7% (Bantjes et al., 2023).

University students are also regarded as the most active social media and technology users (Lattie et al., 2019; Naslund et al., 2020; Ortiz-Ospina & Roser, 2023; Zeeni et al., 2018), with excessive use of a variety of media and technology devices, platforms, and applications (Buckworth & Nigg, 2004; Pedroza, 2017). The effects of the use thereof on their mental health and well-being should not be underestimated nor disregarded. Not only does it have a cumulative effect on increased sedentary behaviour that affects physical and psychological health and well-being (Hanna et al., 2023; Pedroza, 2017), but it has also been identified as an effecting factor on students' self-esteem, academic performance, and psychological well-being (Abrar-ul-Hassan & Safdar, 2022; Valkenburg et al., 2021).

As stated earlier, with the increasing mental health concerns and challenges within the university student population, it is important to address the factors that contribute to this increase in order to contribute and improve possible precautionary measures and early intervention strategies (Bantjes et al., 2019). Numerous international studies and literature focus on the impact of media and technology usage amongst young adults. However, there is

limited literature within the South African context (Bantjes et al., 2019). Therefore, the current study focused and expanded on the possible relationship between media and technology usage and mental health (depression, anxiety, and stress) amongst undergraduate university students within the South African context.

2.4. Media and Technology Usage

The use and accessibility of media and technology worldwide have seen exponential growth and increase in different populations and age groups, especially over the last decade (Ortiz-Ospina & Roser, 2023; Puschmann, 2019; Studen & Tiberius, 2020). This exponential growth and increase can also be seen in the statistics provided by Data Reportal, indicating that internet access increased with 147 million users worldwide in the preceding year from April 2023, indicating an estimated 64.4% of people worldwide being connected to the internet in the first quarter of 2023 (Data Reportal, 2023). The Oxford Dictionary defines media broadly as "any form of communication" (in all different forms and means) (Oxford University Press, 1989, p. 922) and technology as "the application of scientific knowledge for practical purposes, especially in industry, machinery and equipment developed from the application of scientific knowledge, and the branch of knowledge dealing with engineering or applied sciences" (Oxford University Press, 1989, p. 1534). Technology and media include numerous different devices and software (Smith, 2022).

The increase in media and technology usage has received much attention over the last decade, primarily due to the estimated growth and change that is still expected in the years to come (Hillyer, 2020; Parnell, 2018; Prasetyanto et al., 2022). The rapid growth is also evident in the number of cell phone subscriptions globally. Hillyer (2020) stated an estimated 740 million subscriptions in the early 2000s, compared to over 8 billion cell phone subscriptions twenty years later. Statista Research found that in the third quarter of 2022, 97.6% of South Africans used smartphones to access the internet (Statista Research Department, 2023).

Another area that has received a lot of focus and attention is media and internet use, mainly social media (Hillyer, 2020; She et al., 2023). A literature review study conducted on the possible definitions of social media by Aichner et al. (2021) identified that social media does not have a single accepted definition but can rather be defined in broad or specific definitions with a focus on different elements. Wolf et al. (2018) explored the different definitions for social media due to the variety of unclear and insufficient definitions developed and adapted throughout the years. An earlier initial definition of social media was that it is "a platform to create profiles, make explicit and traverse relationships" (Boyd & Ellison, 2008, p. 211; Wolf et al., 2018, p. 3). Due to the constant development and progression of media and technology in itself, Wolf et al. (2018) suggested that the definition of social media is far from having a single accepted definition. They suggested that it will continue to change and adapt as it develops and evolves in the future (Wolf et al., 2018). However, it is suggested that the definition of social media should include "a technological (internet, mobility), ideological (transparency, sharing, integration) and a functional component" (Wolf et al., 2018, p. 5).

Regarding social media usage, there was a global estimate of 7.7 billion internet users (Ortiz-Ospina & Roser, 2023), with an estimated 4.8 billion social media users in 2019 (Nyst, 2023). Facebook had 2.4 billion users, while WhatsApp and YouTube had over 1 billion users, respectively, and TikTok gained an average of 2 million new users every month from 2016 to 2018 (Nyst, 2023; Ortiz-Ospina & Roser, 2023). The same rapid growth and increase in media and social media usage can also be seen in the South African context (Kemp, 2023). In January 2023, there were an estimated 43.48 million internet users in South Africa, with 25.80 million social media users (Kemp, 2023). World Wide Worx (Goldstuck, 2016) also provided statistics within the South African context, indicating the total number of social media users as 13 million Facebook users, 7.4 million Twitter (X) users, 8.25 million

YouTube users, and 2,68 million Instagram users. The age group identified as the most active media and technology users in South Africa were emerging adults (Kemp, 2023). Furthermore, they indicated that an estimated 9.5 million South Africans own cell phones (Goldstuck, 2016; Kemp, 2023). The aforementioned shows that media and technology usage have grown tremendously and will continue to do so (Parnell, 2018). With this rapid growth in the use and accessibility thereof, it is necessary to explore the effects and impact that it might have on the mental health and well-being of individuals using it, especially university students as emerging adults (Kemp, 2023; Naslund et al., 2020; Ortiz-Ospina & Roser, 2023).

Although media and technology use transcends all age and developmental groups, it is, as mentioned, the most prevalent among emerging adults, and more specifically so among university students (Nurudeen et al., 2022; Nyst, 2023; Ortiz-Ospina & Roser, 2023; Sankar, 2020; Schultz, 2023;). University students are regarded as the most active media and social media users (Alonzo et al., 2021; Yadav & Reddy, 2023). In a systematic review study conducted by Shannon et al. (2021), students were identified as the most active social media users and also regarded as a unique population due to them being regarded as the first generation that grew up in a society that is referred to as highly digitalised.

Technology has become an integral part and prominent fixture in students' lives, both for personal use (social, leisure, and interactive use) and academic (educational) purposes, increasingly so after the crucial role that digital technology played in the COVID-19 pandemic (De' et al., 2020; Nurudeen et al., 2022; Raza et al., 2020; Sankar, 2020; Yadav & Reddy, 2023). Most universities transitioned to online teaching, conferencing, and assessment during the pandemic and continued using online platforms for educational purposes post-pandemic (O'Dea & Stern, 2022; Ratten, 2023). Digital platforms for sharing information and documents (e.g., iCloud or Google Drive) have also become a critical source for effecting studies within the higher education systems (De' et al., 2020; Prasetyanto et al., 2022).

Statista Research further indicated that 81% of university students worldwide prefer using digital learning technologies over face-to-face learning and teaching (Statista Research Department, 2023). The increased use of digital technology for personal and academic purposes also relates to increased social media usage, which increases social media addiction or overuse among university students, directly impacting their mental health (Parlak Sert & Başkale, 2022). It has become widely acknowledged that the use of media and technology affects physical health and physiological and psychological well-being, offering positive and/or negative attributes (Pedroza, 2017; Sean, 2018).

Media and technology brought positive advancements to service delivery in the healthcare profession as well, such as teletherapy, symptom checker/screening applications, and online support groups that not only assist individuals in their therapeutic journey but also enable therapists to deliver psychological services remotely and making it more accessible (Hillyer, 2020; Taylor et al., 2020). Suggestions have been made that telehealth post-COVID-19, should remain an area of focus and expansion and that gaps and challenges relating to telehealth should be researched, addressed, and improved since telehealth (technology) offers various advantages, such as accessibility, lower costs, and convenience (Kazdin, 2019; Taylor et al., 2020).

Students struggling with mental illness or symptoms are prone to diverting to social media as a source for collecting advice and evidence relating to their condition, searching for or receiving support, using it as a platform to voice their concerns, and using it more as a form of ‘escaping’ and coping when they feel helpless (Naslund et al., 2020). Naslund et al. (2020) identified three factors or benefits that social media or technology provides to individuals with a mental illness, including assisting with and promoting social interactions, improving accessibility to support groups or peer networks for support, and facilitating engagements and access to treatment. They also identified challenges that individuals with

mental illness might face using media or technology, stating that it can intensify and worsen existing symptoms or cause new symptoms, individuals might be exposed to hostile interactions and cyberbullying and might be victimised, and it can negatively impact their daily life activities, offline relationships and severely impact if the wrong information or guidelines are found, accessed or followed (Alonzo et al., 2021; Naslund et al., 2020).

Therefore, media and technology usage offers benefits and risks for mental health (Zeeni et al., 2018). Lattie et al. (2019) suggested that since media and technology use offer risks and benefits, the focus should rather be shifted to what can be regarded as healthy or unhealthy media and technology use. Media and technology usage will inevitably continue to grow, possibly rapidly (Sean, 2018). Therefore, flexibility, moderation, and adaptations with regard to the new technological era are required since it would be ineffective to expect the use of media and technology to decline due to the number of risks that it entails (Veissière & Stendel, 2018; Verduyn et al., 2015). Greenleaf Walker (2022) added to this positive shift, stating that media and technology that are already at our disposal and fingertips should be utilised optimally and effectively to promote and increase the accessibility of healthcare to individuals in need thereof, specifically regarding psychological interventions.

In the Media and Technology Usage and Attitudes Scale (Rosen et al., 2013) which was used in the current study, eleven subscales were identified to assess media and technology use, including social media use. The eleven subscales include smartphone usage, general social media usage, internet searching, e-mailing, media sharing, text messaging, video gaming, online friendships, Facebook friendships, phone calling, and TV viewing (Rosen et al., 2013). This study focused on technological devices and software frequently used by university students, including the Internet, social media, cell phones, and computers/laptops.

2.4.1. Media and Technology Usage and Mental Health

Media and technology are now more portable, user-friendly, and accessible (Hillyer, 2020; Sean, 2018), raising concerns about media and technology overuse or problematic use thereof among students (Pedroza, 2017). With the increased use of media and technology, the amount of time invested and spent thereon also increases, impacting physical and psychological functioning (Zeeni et al., 2018). Overuse of media and technology has been recognised as a risk factor for mental health concerns among university students (Ahmad et al., 2018; Becker et al., 2013; Bickham et al., 2015; Charles, 2019; Lin et al., 2016; Orsal et al., 2013; Pantic, 2014; Primack et al., 2009; Thapa & Subedi, 2018; Thomée, 2018; Thomée et al., 2011). It is estimated that 90% of university students use social media daily to communicate, share stories, post online, or engage in leisure activities (Ahmad et al., 2018; Gustafsson et al., 2003; Kuppuswamy & Narayan, 2010; Lin, 2016). They spend an average of four hours per day on social media (Henderson, 2020; Primack et al., 2009; Thapa & Subedi, 2018; Vaterlaus et al., 2015). Studies have shown that increased media and technology usage are associated with increased levels of depression, anxiety, and stress (Zeeni et al., 2018).

2.4.1.1 Media and Technology Usage and Depression. Major depression disorder, also referred to as MDD (DSM-5-TR) (APA, 2022a), is a common mood disorder that is mainly characterised by a persistent depressed mood and a loss of interest in activities that one used to enjoy (APA, 2022; Truschel, 2018). To formally diagnose MDD, the symptoms and criteria (as set out in the DSM-5) must be present for at least two weeks (APA, 2022; Truschel, 2018). Other possible symptoms include but are not limited to weight loss or weight gain, feelings of hopelessness and/or worthlessness, chronic fatigue, suicidal ideations and/or attempts, and difficulty concentrating or indecisiveness (APA, 2022; Truschel, 2018; WHO, 2023). (In the current study, the Depression, Anxiety, and Stress Scale [DASS] was

used as a screening tool to measure subclinical levels of depression, and therefore, the focus will not be on MDD specifically).

Looking at general worldwide statistics on depression, the WHO (2023) indicated that an estimated 280 million people suffer from depression globally, which is approximately 10.7% of adults worldwide (WHO, 2023). Depression has also become a major concern among university students since it affects various areas of health and functioning and has been identified as a contributing factor to increased suicide and substance use disorders among the student population (Croock et al., 2023; Sean, 2018). Within the university student population, Chang et al. (2021) found, in their meta-analysis study, that there was a 34% prevalence of depressive symptoms among university students worldwide in 2021. Similar statistics were found in a systematic review study by De Paula et al. (2020), with the results indicating that 26.1% of the student population reported depressive symptoms. Within the South Africa context, Croock et al. (2023) conducted a study at the University of Witwatersrand, Johannesburg. They found a prevalence of 48% of the students screening positive for probable depression. There has been a steady increase in reported depressive symptoms among university students, and inevitably also a noted and parallel increase in the development, use, and access to media and technology among students (Sean, 2018).

Media and technology usage can have both a beneficial and/or detrimental impact on their levels of depression, depending on the type of technology and media use as well as the amount and purpose of the use thereof (Pedroza, 2017; Romer et al., 2013). Excessive media and technology usage can have a deleterious effect on mental health (Lukose et al., 2023), while a moderate amount of technology and media use and access can be beneficial and improve one's mental health (Pedroza, 2017). Large amounts of screen time have been positively associated with increased levels of depression (Kremer et al., 2014) as well as the constant need or pressure to stay connected virtually, which contributes to higher levels of

depression amongst university students (Lukose et al., 2023; Pedroza, 2017). Problematic internet and media usage has been identified as a concern, especially amongst university students, since this population utilises many more functions and applications on technological devices compared to other populations, thereby increasing the amount of time spent on all the different accessible applications and devices (Bianchi & Phillips, 2005; Kuss et al., 2013; Kuss et al., 2014; Lopez-Fernandez et al., 2014; Pedroza, 2017). Research has found that problematic technology and media use is associated with an increased risk of depressive symptoms and suicidal ideations in both male and female students (Çağan et al., 2014; Park et al., 2012; Pedroza, 2017; Thomée et al., 2011). In a study conducted by Islam et al. (2021), a strong link was found between both problematic smartphone use and problematic social media use with increased depression and anxiety among university students. Technological devices that have been associated with increased risk for depression include but are not limited to, cell phones (Pedroza, 2017), televisions (Mekary et al., 2013), and computers, especially relating to video gaming (Mentzoni et al., 2011; Valadez & Ferguson, 2012). Chen (2012) also confirmed a positive association between internet use and increased depression specifically, which includes internet usage for both professional and leisure purposes (Pedroza, 2017). One example is sending and receiving emails. Katikalapudi et al. (2012) and Elhai et al. (2016) similarly found that with new technological advancements, being able to access emails from various devices and places also contributes to increased anxiety and depression due to the need and pressure to constantly be available, responsive, and the pressure to check emails frequently.

Another factor that has received attention and that has been identified as a risk factor concerning increased levels of depression in students is different social media platforms (i.e., Facebook, Twitter, Snapchat, Pinterest, Instagram, Tumblr). Lin et al. (2016) found that there is a positive association between social media usage and depression. Leodoro (2014)

similarly found that an increased amount of time spent on Facebook increases the risk of developing anxiety and/or depression. This phenomenon is known as “Facebook depression” and has become an area of both concern and research interest (Jelenchick et al., 2013; Leodoro, 2014; Yoon et al., 2019). Pedroza (2017) supports this argument, stating that excessive media and technology usage has become a central explanatory factor for insomnia among students, which can also worsen reported depressive symptoms.

It is important to note that available research also supports the opposite view. The use of technology and media for leisure activities, connecting, and communicating with friends and/or family, as well as video gaming, is an important factor and means for reducing anxiety and depression within the student population; however, it is subject to certain limitations and boundaries (Chen, 2012; Cotten, 2008; Cotten et al., 2012). Using technology as a form of coping has been identified as a factor that combats possible depressive symptoms; one such example is using video gaming as a means to relax and distract oneself and also provides a feeling of mastery and/or control in an individual’s life (Pedroza, 2017).

Some literature also suggests that social media, such as Facebook (Jelenchick et al., 2013) and Twitter (Tsugawa et al., 2015), are not associated with depression but rather provide a platform where individuals are supported and can report or express their challenges and depressive symptoms (Rosen et al., 2013), and also assists individuals suffering from social anxiety (Pedroza, 2017). There has also been an argument that media and technology usage merely worsens already existing depressive symptoms or major depressive disorder instead of being the causing factor thereof (Pedroza, 2017).

2.4.1.2 Media and Technology Use and Anxiety. Anxiety should not automatically be regarded as detrimental or defined as a mental illness or pathology due to the fact that anxiety forms part of an inherent, normal, and essential function for survival (Sean, 2018). Although anxiety can be seen as a normal emotional response to stimuli, whether internal or

external, it unfortunately also forms part of a symptom of psychiatric disorders that requires treatment due to the negative impact thereof on an individual's quality of life and functioning (Donzuso et al., 2014). When anxiety becomes chronic and excessive to the initial trigger or cause, the function or effectiveness of the anxiety becomes questionable due to the negative impact thereof, indicating the need for further psychological or psychiatric assessments and interventions (Sean, 2018). When anxiety becomes pathological, it interferes with and affects an individual's ability to cope and function effectively in the face of challenging or stressful events, consequentially having a detrimental impact on the psychological and medical domains of functioning (Steimer, 2022).

It is estimated that approximately 3.6% of the population worldwide suffers from an anxiety disorder, which calculates to an estimated 264 million people worldwide (Hull, 2022). According to the South African Depression and Anxiety Group (SADAG), one out of every six adults in South Africa suffers from anxiety and/or depression (SADAG, 2019). Within the adult population, the student population is exceptionally vulnerable to experiencing anxiety and depressive symptoms (Kalinin et al., 2021; Deng et al., 2021). In a literature review and meta-analysis study by Deng et al. (2021), it was indicated that university students have a 32% prevalence of anxiety symptoms. In another study by De Paula et al. (2020), the results showed anxiety symptoms among students to be at a prevalence rate of 24.5%. Moreover, in a South African survey conducted among university students, 15.8% of students reported moderate to severe anxiety symptoms (Barton & Hirsch, 2015). Bantjes et al. (2019) conducted a study among university students in Cape Town, South Africa. They found Generalized Anxiety Disorder with a high prevalence rate of 31.5%. Multiple factors could potentially contribute to the increased anxiety evident among university students, but one such contributing factor identified was students' media and technology usage (Alsunni & Latif, 2020).

Mobile phones have been associated with higher levels of anxiety due to the pressure experienced to always be connected, responsive, and reachable (Lepp et al., 2014; Pedroza, 2017). Individuals who feel disconnected or excluded from technology or the cyber world may experience increased levels of anxiety, a phenomenon known as FOMO or fear of missing out (Przybylski et al., 2013). An interesting new phenomenon called "ringxiety" or "phantom vibrations/ringing" defines the interesting occurrence where mobile phone users hear or feel their mobile phones ringing or a notification alert, even when there is none (Deb, 2015; Kshirsagar et al., 2018, p. 141). Ringxiety affects almost all cell phone users and increases anxiety levels due to the pressure and need to always be connected and reachable, whether for professional, leisure, or relational purposes (Elhai et al., 2016; Kruger & Djerf, 2016). High ringxiety has especially been found among individuals with insecure attachments due to their needs and desire to be reassured and feel connected, exacerbating existing levels of anxiety (Kruger & Djerf, 2016). In a study conducted by Alsunni and Latif (2020), the emotional attachment that students have towards social media as part of their daily routine and functioning has been identified as a central factor leading to increased levels of anxiety.

Upward social comparisons, especially among students using social media platforms, have been identified as a concerning factor that detrimentally affects their self-esteem, self-worth, and self-criticism, causing and/or exacerbating levels of anxiety (Hawes et al., 2020; Jiang & Ngien, 2020; Sean, 2018). This social comparison effect has been referred to as the "compare and despair" phenomenon and has been identified as a major source of causing or increasing anxiety symptoms (Sean, 2018, p. 12). Davey (2016) expressed the concern that the social media platform has become a platform that students use to quantify the number of friends they have or the number of people they know, directly or indirectly comparing and competing against their peers, consequently leading to increased anxiety (Davey, 2016).

Technology and social media have become an important mediating factor for students who struggle with social anxiety due to the comfort and security of being anonymous and feeling less pressured within social settings or interactions (Jiang & Ngien, 2020), consequently decreasing levels of anxiety (Arslan et al., 2021; Pedroza, 2017). In a study by Arslan et al. (2021), student media usage was identified as a factor in improving and assisting with social adjustment and anxiety in the university setting. In a meta-analysis study amongst individuals with social anxiety, it was found that internet use did provide these individuals with comfort and security, even when this was only online as it alleviated the pressure of using social cues and provided security knowing one can remain anonymous or could have time to think about more 'appropriate' responses without the pressure of being observed or scrutinised in a social setting (Lee-Won et al., 2015; Pedroza, 2017; Prizant-Passal et al., 2016).

Technology use (e.g., watching television and participating in video gaming) can assist students to relax and decrease levels of tension and anxiety (Pedroza, 2017). With the easily accessible and user-friendly platforms that provide online counselling, support groups, and hotlines, students in need can contact or reach out to these services in emergencies, which creates a feeling that they are not alone and that help is always available, subsequently decreasing levels of anxiety (Pretorius et al., 2019).

It is evident from the literature addressed above that there is a negative relationship between media and technology usage and anxiety (Casale & Fioravanti, 2015; Dobrean & Pasarelu, 2016; Rosen et al., 2014). However, the opposite has also been proved: no detrimental relationship exists between media and technology usage and anxiety in students (Green et al., 2016; Grieve et al., 2013). An important determining factor identified is how media and technology are used, being a subjective factor that impacts every individual differently (Pedroza, 2017).

2.4.1.3 Media and Technology Use and Stress. The WHO defines stress as a state of worry or mental tension caused by a difficult situation (WHO, 2023a). Stress, similar to anxiety, forms part of a natural human instinct and response, serving as a driving force when facing threats or challenges, either directly or indirectly, imminent or distant (Sean, 2018; WHO, 2023). However, even though stress plays an important role in our functioning, chronic or excessive stress can have a detrimental impact on our health in various domains, including but not limited to psychological, biological, and physiological health and well-being (Asad et al., 2023; Sean, 2018; WHO, 2023).

In an international study conducted by The American Institute of Stress [AIS] in 2022, statistics on stress amongst the American population indicated that 77% and 73% of individuals reported that stress negatively affects them physically and mentally, respectively (AIS, 2022; Zauderer, 2022). In the South African context, a pharmaceutical firm (Pharma Dynamics) conducted a national survey in 2020 with more than 1200 adult participants, which indicated that stress amongst the South African population increased by 56% after the COVID-19 pandemic (Kenny, 2020).

Increased stress among university students is not uncommon (Asad et al., 2023). Increased psychological distress among university students has been a longstanding and current concern worldwide (Sharp & Theiler, 2018). High levels of stress have been found among university students, identifying that a long period of stress can negatively impact students' general mental health and academic performance (Sharp & Theiler, 2018; Slimmen et al., 2022). Nadeem and Shakir (2018) found in their study that among 504 university students, 52.7% had elevated levels of stress. Another common form of stress among students is Technostress, which is identified as a leading concern and point of interest relating to the stress caused by media and technology use (Asad et al., 2023). The need to stay connected and close to media and technology has been termed Technostress or ICT stress due to the

physiological arousal experienced as high levels of stress when an individual feels unconnected and/or pressured to be reachable and available at all times (Bickham et al., 2015; Gustafsson et al., 2003; Sansone & Sansone, 2013; Thomée et al., 2007; Thomée et al., 2011). The increased stress caused by the prolonged exposure and use of media and technology (i.e., Technostress) highlights the challenge that individuals face in attempting to cope and adapt healthily to the continuously expanding technologies in the modern era (De' et al., 2020; Torales et al., 2022). Technostress syndrome also refers to the physical and psychological symptoms present in an individual due to increased stress caused by technology use (Torales et al., 2022).

University life requires students to use media and technology in conducting and completing their studies, therefore increasing the amount of time spent using media and technology during their studies (Pedroza, 2017). The amount of screen time that students are exposed to (Sean, 2018) has also been raised as a matter of concern, especially relating to the effect thereof on their sleeping patterns, since less sleep has been associated with increased levels of stress and decreased ability to deal with stress effectively (Minkel et al., 2012).

Problematic or excessive media and technology use among university students has been significantly associated with increased psychological distress (Chen et al., 2020; Wong et al., 2020). Increased stress can reduce students' well-being, increasing probable problematic and excessive media and technology usage (Brailovskaia et al., 2023). Ogunmodede et al. (2023) conducted a cross-sectional study on the impact of smartphone and social media use on psychological distress. In this study, 33.2% of the undergraduate university students who participated and used smartphones and social media indicated the presence of increased stress symptoms. Factors identified as predictors of psychological distress include the following: problematic smartphone use; large amount of time spent on

their mobile phone; frequent social media use and browsing, specifically WeChat and Facebook; and engagement in overnight calls and/or chats.

Other available literature also supports the contrary, stating that students depend on media and technology for both educational and leisure purposes, and have been identified as factors that possibly reduce stress and assist students in coping and performing academically (Hampton et al., 2016; Pedroza, 2017). Media and technology have become important resources that facilitate virtual social support, advance access to information, and increase convenience in getting work done effectively, which are factors that decrease levels of experienced stress (Garfin, 2020). Media has also been identified as an important resource to assist university students with the stressful transition into the tertiary education system, reducing stress levels relating to loneliness, decreased social support, and academic adjustment and performance (Thomas et al., 2019).

2.5. Attitude towards Media and Technology and its Impact on Mental Health

Social media dependence and addiction among university students is a growing concern as it relates to their attitudes towards social media content, usage, and multitasking (Bickham et al., 2015; Chukwuere & Chukwuere, 2017; Lin et al., 2016; Pantic, 2014; Thapa & Subedi, 2018; Thomée et al., 2011), which also directly impacts their mental health concerns as discussed (Becker et al., 2013; Thaba & Subedi, 2018; Vaterlaus et al., 2015; Yadav & Reddy, 2023). Although some university students view social media connectedness as beneficial for social support and relationships, these interactions can be shallow and inadequate to protect them from mental health concerns such as depression, anxiety, and stress (Bickham et al., 2015; Pantic, 2014; Thaba & Subedi, 2018). Therefore, an individual's attitude towards media and technology is an important mediating factor between the use of media and technology and the effects thereof on an individual's mental health (Petrides, 2010; Zeeni et al., 2018). Therefore, students' attitudes towards media and technology

influence their views or perspectives as well as their behaviour and use of media and technology (Orgaz et al., 2018). A positive attitude toward media and technology can improve students' academic functioning and performance (Orgaz et al., 2018).

As mentioned, pathological and/or excessive media and technology use among students has become an area of growing concern (Alonzo et al., 2021; Coyne et al., 2019; Li et al., 2015; Zeeni et al., 2018). Problematic media and technology usage signs and symptoms are similar to those of gambling addiction, including but not limited to excessive time, money, and energy spent using it, increased levels of anxiety when being without it, using it in dangerous situations (e.g., when driving), preoccupied with it to such an extent that it negatively interferes with important areas of function such as relationships and/or work (Coyne et al., 2019; De Doncker & McLean, 2022). Problematic use of media and technology is associated with increased levels of anxiety, depression, and stress (Alonzo et al., 2021; Coyne et al., 2019). Therefore, a negative attitude towards media and technology has been identified as a contributing factor to problematic and excessive media and technology use, which detrimentally impacts students' mental health, specifically depression, anxiety, and stress (Coyne et al., 2019).

Students' subjective views and experiences of their locus of control also play a critical role in the effects on mental health (Li et al., 2015). Li et al. (2015) found that an internal locus of control increases resilience regarding the detrimental impact of problematic and excessive media and technology use, whereas an external locus of control increases the likelihood of falling into problematic use, negatively affecting their subjective well-being. Therefore, Zeeni et al. (2018) highlighted the importance of self-control, self-discipline, healthy boundaries and limitations regarding media and technology usage among students. Students multitasking behaviour and switching between online media and non-online media activities or between different technological devices or platforms is another identified

influential factor since it strongly links poor academic performance and increased stress and anxiety in South African students (Le Roux et al., 2021). Le Roux and Parry (2019) thus emphasised the importance of South African university students' self-regulation on media and technology use to counter the negative impact on their academic performance and mental health. The challenge that university students face with self-control has been termed the "Self-control Dilemma" and is defined as "a competition between an immediate low-priority impulse and between a distal high-priority goal" (Sternberg et al., 2020, p. 1). Poor self-control leading to excessive media and technology usage has been strongly linked with increased anxiety among university students (Sternberg et al., 2020).

Another important element influencing individuals' vulnerability to the negative effects of media and technology use is trait emotional intelligence (TEI) (Zeeni et al., 2018). Trait emotional intelligence is defined as "a constellation of emotion-related self-perceptions located at the lower levels of hierarchical personality structure" (Petrides, 2010; Zeeni et al., 2018, p. 305). It allows for and recognises an individual's subjective and inner emotional experience and regards these as one's inherent personality traits (Petrides, 2010). Trait emotional intelligence has been identified as a moderating factor for the effects and impact of unhealthy habits, negative influences, and overall well-being (Zeeni et al., 2018). Zeeni et al. (2018) emphasised that, even though students are identified as a vulnerable population regarding the negative effects of media and technology use, the crucial role that trait emotional intelligence plays as a protective factor should not be overlooked or underestimated. Therefore, a pathological attitude towards and using media and technology has been identified as factors that negatively impact students' physical and psychological health and well-being (Zeeni et al., 2018).

For Twenge (2019), limited and healthy use of media and technology can be beneficial. Verduyn et al. (2015) specifically focused on Facebook use. They found that

passive Facebook use and passive browsing and viewing other people's content are harmful to one's mental health. In contrast, more active engagement, participation, and connection are not as detrimental to one's mental health. Within the South African context, De Doncker and McLean (2022) stated that how students perceive social media content and information could either increase or decrease their self-esteem.

Balancing and controlling the use of media and technology, along with a healthy attitude towards its use to foster a balanced and healthy use thereof, seems to be the critical factor that should receive more attention (Twenge, 2019; Zeeni et al., 2018). It should also be noted that the views and attitudes towards media and technology might differ in different countries worldwide (Emm, 2021). Attitudes towards different media and technology can also differ depending on individuals' context, needs, and demands (Tondeur et al., 2016). Literature suggests that South Africans are changing their attitudes and views about media and technology and its effects on mental health; South Africans are attempting to strive towards a healthier digital balance (Emm, 2021).

2.6. Sex and Mental Health

Biological sex as an influencing factor should also be considered and accounted for since sex is one of the most important and influential factors in health outcomes (Spagnolo et al., 2020). There seem to be differences between male and female university students regarding their mental health (Afifi, 2007; Coyne et al., 2020; WHO, 2020). Females have a higher vulnerability when it comes to mental health challenges, such as depression, anxiety, and stress, compared to males (Christiansen, 2015; Gao et al., 2020; Spagnolo et al., 2020). Female students are more inclined to experience and report higher levels of stress, anxiety, depression, suicide attempts, and eating disorders, while male students are more inclined to experience and report substance abuse and aggressive outbursts and behaviours (Gao et al., 2020; Gibson et al., 2016; Spagnolo et al., 2020). Thus, internalising psychiatric disorders are

found to be more prominent among female students (e.g., eating disorders, anxiety, and mood disorders) (Gibson et al., 2016; Tseng et al., 2013), while externalising psychiatric disorders are more prominent among male students (e.g., conduct and substance use disorders) (Leppink et al., 2014). These differences can be attributed to the interplay between biological, social, and psychological factors in different sexes (Afifi, 2007; Ahmad et al., 2018; Bantjes et al., 2019; Coyne et al., 2020; Gao et al., 2020; Ibrahim, 2013; Primack et al., 2009; Schreiber, 2018; Thomée, 2018; Thomée et al., 2011; WHO, 2020). Female students are also more inclined towards health-seeking behaviour and utilisation of psychotherapy resources compared to male students (Bantjes et al., 2020; Hubbard et al., 2018), with female students also reporting a wider variety of symptoms being present (especially in depression) compared to male students (Gao et al., 2020; McIntyre et al., 2014).

In a longitudinal study by Gao et al. (2020), it was found that female students had higher levels of stress and anxiety compared to their male counterparts over a four-year period. In another meta-analysis study by Daniali et al. (2023), depression, anxiety, and stress were compared in 59 studies involving 47 countries, with the results indicating that female students had higher levels of depression, anxiety, and stress symptoms, both before and after the COVID-19 pandemic, compared to male students.

Media and technology use and the impact thereof might differ according to sex (Naslund et al., 2020; Twenge & Martin, 2020), as well as the type of media and technology use and the patterns of use (Su et al., 2020). Twenge and Martin (2020) suggested that the impact of electronic communication on well-being might be higher among females than males (Naslund et al., 2020). Tondeur et al. (2016) identified women as less positive towards media and technology. Thus, females tend to be more vulnerable to media and technology addiction and dependence than males (Coyne et al., 2019). There has been an increased concern relating to females' body image and self-esteem since upward social comparison has

mainly been prominent amongst females (Tiggemann et al., 2018). Men are also seen as having a more positive view on the use of technology (e.g., computers), with men engaging more frequently in computer gaming or other computer-related leisure activities (Tondeur et al., 2016), while females tend to spend more time on social media (Twenge & Martin, 2020). Literature also suggests that females are more inclined to use media for interpersonal communication and information purposes than males, who tend to use it mainly for entertainment (Su et al., 2020).

2.7. Generational Status and Mental Health

Previous studies found a correlation between university students' generational status and mental health concerns, with first-generation students being more inclined to experience higher levels of stress, anxiety, depression, and overall feeling overwhelmed compared to non-first-generation students (Bantjes et al., 2019; Becerra, 2017; Bostic, 2013; Garriott & Nisle, 2018; Lippincott & German, 2007; Stebleton et al., 2014). First-generation students refer to students from families whose parents and/or guardians did not obtain a tertiary degree (Bachelor's degree or higher) (Schuyler et al., 2021). A study conducted in the US found that about 56% of students are first-generation students, with 30% being students who also fall within the minority groups in terms of race and income/wealth (Schuyler et al., 2021). In the South African context, it has been identified that the majority of first-generation students come from a disadvantaged background with fewer resources and a history of parents who have been denied or lost the opportunity to continue with higher education or to have any education at all (Motsabi et al., 2020). In the South African context, first-generation students also possibly lack family support and guidance, face financial constraints and lack cultural capital and academic skills (Garriott & Nisle, 2018; Jenkins et al., 2013).

Transitioning into the tertiary education system has been identified as a challenging period for students in general (Schuyler et al., 2021). A difficult transition intensifies the

impact on students' psychological well-being, especially depression, anxiety, and stress (Beiter et al., 2015; Schuyler et al., 2021). First-generation students and non-first-generation students face similar challenges with regard to academic demands. However, first-generation students face additional personal as well as individual challenges besides the already mentioned transition, which includes factors such as the absence of family support (first-hand exposure to the system), lack of prior academic preparation and guidance as well as a challenging, new cultural transition within the family context, directly affecting both their academic performance and general mental health (Chang et al., 2019; House et al., 2019; Motsabi et al., 2020; Schuyler et al., 2021). First-generation students also possibly feel uncertain or negative about their sense of belonging within the university setting, which directly impacts their academic performance, general mental health, and day-to-day functioning (Gillen-O'Neel, 2019).

A mental health survey conducted by the WHO in 2016 found that only 6.4% of students diagnosed with a psychiatric disorder in 21 respective countries received psychotherapy in the prior 12 months (Auerbach et al., 2016). Students are generally disinclined to seek or ask for psychological intervention, both in South Africa and internationally (Bantjes et al., 2020; El Kahi et al., 2012). In a study conducted by Hubbard et al. (2018), barriers to help-seeking behaviour included the fear of stigmas, concerns about privacy and confidentiality, feelings of failure, lack of knowledge and/or insight into the condition and their realisation of the need for interventions (Bantjes et al., 2020). With these findings in mind, it is important to note that first-generation students have been identified as less likely or inclined towards the utilisation of healthcare services and seeking healthcare and psychological interventions in general when compared to second-generation students (Bantjes et al., 2020; Chang et al., 2019).

2.8. The South African Perspective

There are multiple international resources available on media and technology usage, attitudes towards media, sex, and generational status as predictors of mental health among university students. However, resources within the South African context are rather limited (Bantjes et al., 2020). As stated by Bantjes et al. (2019), common mental disorders (e.g., depression, anxiety, and stress) are commonly found among the university student population in low- and middle-income countries such as South Africa, emphasising the growing need for early detection, intervention, and effective treatment among students.

There has been a noted decrease in mental health and general psychological well-being among South African university students, and therefore, an identified unmet need for psychological intervention and support for South African students (Eloff & Graham, 2020; Greenleaf Walker, 2022). Pillay et al. (2020) found that there is an alarming concern about the reported mental symptoms among university students in South Africa, which Rousseau et al. (2020) also confirmed. Not only do their mental health concerns lead to an impact on a systemic level, but they also affect sustainable economic development since these students are regarded as potential employers and entrepreneurs of the future (Eloff & Graham, 2020).

There is also insufficient research conducted on South African university students' transition to university life and their generational status and the correlation thereof on mental health and well-being, especially relating to their anxiety, depression, and stress (Olasupo et al., 2018). The growing use of media and technology among South African students and its predictive value on students' academic functioning and mental health has also been identified as an area of concern, necessitating further investigation (Breines et al., 2020). Over the last few years, media and technology use in the tertiary education system in South Africa has become inevitable, including the impact thereof on students' mental health and well-being (Mpungose, 2021).

Breines et al. (2020) noted that students' country, place of residence, and sex are only some of the factors that should be taken into account when considering the impact of media and technology use on the mental health and academic performance of students (Breines et al., 2020). This study, therefore, aimed to contribute to the need for further research among the South African university student population, focusing on investigating media and technology usage, attitudes towards media and technology usage, sex, and generational status as possible predictors of university students' mental health (depression, anxiety, and stress).

2.9. Summary

Literature has shown that numerous factors impact students' mental health. Student mental health has become an area of great interest and concern due to the symptoms reported among students, more specifically, depression, anxiety, and stress. This also holds true in the global realm and the South African context. Emerging adulthood has been identified as a crucial yet challenging developmental phase, especially for university students, since the majority of undergraduate university students find themselves within the emerging adulthood developmental phase. University students have been identified as a vulnerable population when it comes to mental illness due to multiple reasons and impacting factors. The transition to university life is one such factor. First-generation students might find the transition to university life more challenging than non-first-generation students, which also requires further investigation within the South African context. All these factors have been identified as possible predictors of students' mental health, specifically depression, anxiety, and stress.

Furthermore, media and technology usage has become an integral part of student's daily functioning and interaction, leading to increased use of media and technology among university students. The increased use of media and technology has also been shown to have an impact on students' mental health. The impact of media and technology use on South African university student mental health is an area that justifies the need for further research

and investigation. Another possible predictor of students' mental health is their attitude toward media and technology use. Therefore, students' attitudes towards media and technology use, as well as their sex (i.e., male and female) with regard to their mental health, was an area of interest and research in the South African context in the current study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

Chapter Three discusses the study's research methodology used to investigate the relationships between the relevant dependent and independent variables in a research sample of 1191 undergraduate university students at the University of the Free State, Bloemfontein Campus, South Africa. In this study, the independent variable(s) were media and technology usage, attitudes towards media, sex, and generational status, whereas the dependent variable was mental health, specifically depression, anxiety, and stress. This chapter also presents the research aim, research objectives, and the research questions that the study aimed to answer. Subsequently, the research design and methods used will be discussed, followed by an elaboration on the sampling method employed in the original study. Thereafter, the data collection procedures and the three measurement scales utilised will be discussed, as well as the statistical procedures and relevant data analysis methods used. Lastly, the ethical considerations related to the study will be addressed, followed by the summary of Chapter Three.

3.2. Research Aim, Research Objectives, and Research Questions

This study aimed to determine which variable(s) or combination of variables will explain a significant percentage of the variance of mental health among undergraduate university students. In order to address this research aim, the following research questions were investigated:

- Can the combination of media and technology usage, attitudes towards media, sex, and generational status explain a significant percentage of variance in the mental health of undergraduate university students?

- Do any of the individual predictor variables significantly contribute to the variance in the mental health of undergraduate university students?

Furthermore, the main objective of this research study was to determine which predictor/independent variable(s) investigated in the current study was responsible for the largest percentage of variance in the mental health (i.e., depression, anxiety, and stress) scores of undergraduate university students at the University of the Free State, Bloemfontein. The investigated predictor/independent variable(s) included media and technology usage, attitudes towards media, sex, and generational status of students. Moreover, the differences in the mental health of undergraduate university students with regard to sex (male vs female) and generational status (first-generation vs non-first-generation) were also investigated in the study.

3.3. Research Design and Methods

In this study, a quantitative research approach was used, and the study was non-experimental in nature since no intervention or manipulation of variables took place and participants were not randomly assigned (Maree, 2019; Stangor, 2015). Quantitative research is an objective research approach that uses numerical data gathered from an identified and selected subgroup (sample) of a population in order to derive insights and possible relationships between the variables in a study (Maree, 2019). In a non-experimental research design, such as in this current research study, all the participants from the selected subgroup are measured on all the variables studied at a specific time with no manipulation, thereby mainly providing descriptive statistics (Maree, 2019).

This study used a cross-sectional correlational research design to investigate the relationships between the different dependent and independent variables (Howell, 2017; Stangor, 2015). A correlational research design enables researchers to investigate the relationships between the relevant measurable variables in a study (Howell, 2017). This study

used a cross-sectional correlational research design to investigate the relationships between the independent variables, namely media and technology usage, attitudes towards media, sex, and generational status, and the dependent variable, mental health (i.e., depression, anxiety, and stress). In the current study, the research questions focused on the relationships between the relevant variables. In order to answer these research questions, Pearson correlations were calculated, and regression analyses were conducted. Below is a thorough discussion and elaboration on the relevant data analysis and procedures. Lastly, only correlations between variables are examined in a correlational study, and findings do not imply causation (McLeod, 2020).

3.4. Sampling and Research Sample

An existing data set of a research project titled "*Predictors of psychological well-being amongst university students*" was used (Ethics number: UFS-HSD2017/1313). Thus, this research study entailed a secondary analysis of existing data (Johnston, 2014; Tripathy, 2013) to answer research questions different from the original research project. Non-probability sampling, namely convenience sampling (Stangor, 2015), was used in the original research project to recruit the participants. Convenience sampling is a method used to collect research data from a pool of respondents that is easily, conveniently available, and accessible to the researcher (Maree, 2019), such as in the original study where data was collected from students registered at the University of the Free State. The sample consisted of 1 191 undergraduate university students between 18 and 29 years from the Faculty of the Humanities of the University of the Free State (UFS), Bloemfontein, South Africa. Undergraduate university students from different sexes, ethnic groups, majors, generational status and religious affiliations participated in the research project. University students who did not meet the inclusion criteria or fell within the specific age group of emerging adults were excluded from the sample.

3.5. Data Collection Procedures and Measurement Scales

As mentioned, an existing data set of a research project was used in this study. Undergraduate students from the Faculty of the Humanities at the University of the Free State were invited to participate in the study voluntarily. They were requested to complete the relevant questionnaires provided in English, which were used as the measurement scales in the current study. The measurement scales were made available to the students electronically using the UFS Blackboard online platform. The UFS Blackboard platform is an online student portal where relevant academic resources are made available to the students and includes student's assessments and activities that can be accessed and/or submitted on the platform electronically (Khair et al., 2021).

In this study, the focus was on three measurement scales that were used to collect the data:

a) The Media and Technology Usage and Attitudes Scale (MTUAS)
b) The Depression, Anxiety and Stress Scale (DASS)
c) A biographical questionnaire

3.5.1. The Media and Technology Usage and Attitudes Scale (MTUAS)

The *Media and Technology Usage and Attitudes Scale* (MTUAS; Rosen et al., 2013) was used to measure the participant's media and technology usage, as well as their attitudes towards media and technology. The MTUAS is divided into two sections consisting of 60 items with 15 subscales. Section one of the MTUAS has 11 subscales with 44 items wherein the frequency of various media and technology usages are measured. The various usage subscales with the respective number of items include Smartphone Usage (9 items), General Social Media Usage (9 items), Internet Searching (4 items), E-mailing (4 items), Media Sharing (4 items), Text Messaging (4 items), Video Gaming (4 items), Online Friendships (3 items), Facebook Friendships (2 items), Phone Calling (2 items), and TV Viewing (2 items)

(Rosen et al., 2013). Section two of the MTUAS consists of four subscales with 16 items that measure attitudes towards media and technology. The four subscales with the respective total number of items include Positive Attitudes toward Media/Technology (6 items), Anxiety about being without Media/Technology or Dependence on Media/Technology (3 items), Negative Attitudes toward Media/Technology (3 items), and Preference for Task Switching (4 items) (Rosen et al., 2013).

Section One of the MTUAS (which consists of 44 items in total) measures the first 40 items of media and technology usage that are rated on a ten-point Likert-type scale with response options ranging from 1 ("*never*") to 10 ("*all the time*"). Thereafter, items 41 to 44 focus on the participants' online friends and the extent of their interaction with their online friends. These items are rated on a nine-point Likert-type scale that quantifies their friends related to each item, ranging from 1 ("*0*") to 9 ("*751 or more*"). Higher scores on the usage subscales indicate higher frequency in media and technology usage (items 1–40) and higher number of friends the participant relates to (items 41–44). For this study, the 11 media and technology usage subscales were grouped into three dimensions: (i) Media Usage for Social Engagement (MUSE), (ii) Media Usage for Communication (MUC), and (iii) Media Usage for Leisure (MUL) as was done in previous studies (Cronje, 2019; Maoela, 2022; Nel, 2021; Van Tonder, 2020; Van Tonder et al., 2023). Section Two of the MTUAS measures the items of the Attitudes subscales. These items are rated on a five-point Likert-type scale with response options ranging from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). Therefore, a higher rated score on the Attitude subscales indicates either more positive attitudes towards media and technology, more negative attitudes towards media and technology, higher preferences for task switching, or higher levels of anxiety or dependence towards media and technology (Rosen et al., 2013).

In the initial study conducted by Rosen et al. (2013), adequate to exceptional internal consistencies (Cronbach alphas) were found for the 11 different subscales, ranging from .61 to .97. In the current study, the results (see Chapter Four) indicated adequate to exceptional internal consistencies for the 11 subscales, ranging from .73 to .94. Comparing to previous studies, adequate to good internal consistencies have also been reported for the Media and Technology Usage subscales ranging between .71 and .89 (Cronje, 2019; Özgür, 2016; Van Tonder, 2020). With regards to the three dimensions of the Media and Technology Usage subscales, the current study found good to exceptional levels of internal consistency, namely .884 for Media Usage for Engagement, .949 for Media Usage for Communication, and .954 for Media Usage for Leisure (see Chapter Four). These findings are in line with the internal consistencies reported in South African studies conducted by Van Tonder (2020), Van Tonder et al. (2023), Cronje (2019), Nel (2021), and Maoela (2022), with internal consistencies also ranging between .88 to .95.

With regards to the Attitudes towards Media subscales, Rosen et al. (2013) reported good internal consistencies ranging from .80 to .87. In the current study, the internal consistencies for the Attitudes subscales were slightly lower, ranging from acceptable (.674) to good (.814) (see Chapter Four). The internal consistencies for the Attitudes towards Media subscales in the current study were .814 for the Positive Attitudes subscale, .779 for the Media Anxiety/Dependence subscale, .674 for the Negative Attitudes subscale, and .689 for the Preference for Task Switching subscale. Similar, comparable internal consistencies were reported in previous studies (Costa et al., 2016; Sabbah et al., 2019), ranging from .68 to .77 for the Positive Attitudes subscale, .81 to .84 for the Anxiety/Dependence subscale, .68 to .69 for the Negative Attitudes subscale, and .54 to .77 for the Preference for Task Switching subscale.

3.5.2. Depression, Anxiety and Stress Scale (DASS)

The *Depression, Anxiety and Stress Scale* (DASS; Lovibond & Lovibond, 1995) was utilised to measure the students' mental health, more specifically their subclinical levels of depression, anxiety, and stress. The DASS consists of 42 items measuring three subscales, namely Depression, Anxiety, and Stress. The Depression subscale assesses depressive symptoms (e.g., dysphoria, devaluation of life, lack of interest and/or involvement, inactivity, and self-depreciation) (Lovibond & Lovibond, 1995; Syed et al., 2018; Yakasai et al., 2022). The Anxiety subscale assesses anxiety symptoms such as autonomic signs, situational anxiety, anxious affect subjectively experienced as well as skeletal muscle effects experiences (Abiola et al., 2015; Lovibond & Lovibond, 1995; Yakasai et al., 2022). The Stress subscale assesses symptoms, which include difficulty relaxing, nervous arousal, irritable or over-reactive mood, feeling impatient and being easily upset and/or agitated (Lovibond & Lovibond, 1995; Yakasai et al., 2022). Each of the three subscales consists of 14 items. The items are rated on a four-point Likert-type scale with response options ranging from 0 ("*Did not apply to me at all*" or "*never*") to 3 ("*Applied to me very much*" or "*most of the time*") (Lovibond & Lovibond, 1995). Higher scores obtained indicate higher levels of depression, anxiety, and stress. The DASS questionnaire serves as an effective screening tool for depression, anxiety, and stress; it is, however, not used as a diagnostic tool (Ali et al., 2021).

Good to exceptional internal consistencies (Cronbach alphas) ranging from .89 to .94 have been reported for the DASS subscales in previous studies (Akin & Çetın, 2007; Shayan et al., 2021; Yakasai et al., 2022). In the current study, exceptional internal consistencies were also found for each subscale, with .940 for the Depression subscale, .913 for the Anxiety subscale, and .916 for the Stress subscale. In previous studies (Shayan et al., 2021; Yakasai et al., 2022), good internal consistencies were reported, ranging from .87 to .89 for

the Depression subscale, .83 to .85 for the Anxiety subscale, and .85 to .87 for the Stress subscale.

3.5.3. Biographical Questionnaire

A self-compiled biographical questionnaire was used to collect demographic data of the participants. The biographical data obtained from the questionnaire include sex, age, race, ethnicity, majors, religious affiliation, and generational status. The biographical data used as independent variables in the current study included the participants' sex (male and female) and generational status (first-generation and non-first-generation).

3.6. Procedures and Data Analysis

The Statistical Package for Social Sciences (SPSS, Version 29; IBM Corporation, 2023) was used to analyse the data to answer this study's relevant research question(s). SPSS is a statistical software platform that allows scientific data to be captured, organised and analysed, allowing the researcher to answer questions posed in a study using quantitative results and data (William, 2022). In order to determine the internal consistency (reliability) of the measurement scales used, Cronbach alphas were calculated for each of the three dimensions of the MTUAS (i.e., Media Usage for Engagement, Media Usage for Communication, and Media Usage for Leisure), the Attitudes towards Media subscales (i.e., Negative Attitudes towards Media and Technology, Positive Attitudes towards Media and Technology, Anxiety/Dependence towards Media and Technology, and Preference for Task Switching), and the DASS subscales (i.e. Depression, Anxiety, and Stress). From the results of the Cronbach alpha, the internal consistency of the relevant measurement scales and subscales was identified (Collins, 2007). In the current study, the internal consistencies (Cronbach alpha coefficients) ranged from .674 to .954 (see Chapter 4), thus displaying acceptable to excellent levels of internal consistency (Vogt, 2005).

Descriptive statistics of the sample were analysed and elaborated on (see Chapter 4). The descriptive statistics were calculated regarding their sex, ethnicity, culture, year of study, major, living arrangement, religious affiliation, generational status, relationship status, province, education of parents, happiness at the university and satisfaction with the university. More information was gathered on the sample from the descriptive statistics. The two descriptive statistics, namely sex and generational status, were included as two predictor (independent) variables in the study. Descriptive statistics fulfil an important role in summarising and describing data to provide a thorough understanding and picture of the characteristics of the relevant research sample (Vetter, 2017). Descriptive statistics provided on the research sample are not only a useful tool for future researchers in deciding on new sample sizes and dynamics for future research but are also vital information that should be considered when interpreting the results in instances where an individual or a clinician works with the population or a patient that the research findings could apply to (Fulk, 2023).

Furthermore, Pearson correlation coefficients were calculated to investigate the strength, direction and significance of the correlations or relationships between the variables (Stangor, 2015). Moreover, hierarchical multiple regression analyses were conducted to determine which predictor (independent) variable(s) or combination(s) of predictor variables (i.e., media and technology usage, attitude towards media, sex, and generational status) contribute to a significant percentage of variance in the mental health (i.e., depression, anxiety, and stress) of undergraduate university students that participated in the study (N=1191) (Petrocelli, 2003). Hierarchical multiple regression analysis allows researchers to predict the dependent (outcome) variable based on multiple independent (predictor) variables that are investigated in a study by entering the independent (predictor) variable(s) into the regression equation on the SPSS programme (Ross & Willson, 2017). It also assists in determining the proportion of variance in the outcome or dependent variable, as explained by

adding the independent or predictor variable(s) to the regression equation (Ross & Willson, 2017). Thus, the goal of hierarchical regression analysis is to determine if the independent (predictor) variable(s) newly added to the regression equation could better explain the relevant dependent (outcome) variable that is being investigated or whether the new independent (predictor) variable added explains significantly more variance in the dependent (outcome) variable, above and beyond the independent (predictor) variable(s) already added into the regression equation (Yang, 2022). Therefore, in the current study, hierarchical multiple regression analyses were used to examine the prediction of depression, anxiety, and stress by using media and technology usage, attitude towards media, sex, and generational status as the predictor variables. Subsequently, in using the hierarchical regression analyses technique, the effect size of the predictor variable was determined; this was done by calculating the change in the adjusted R^2 at every step of the analyses, subsequently identifying the increment of variance after each predictor variable is entered into the regression model (Howell, 2017; Maree, 2019).

Following the hierarchical regression analyses, stepwise regression analyses were also conducted with a forward selection procedure. Stepwise regression analysis is an iterative, step-by-step model whereby predictor (independent) variables are added to the regression equation to identify a set of predictor variables that significantly influence the outcome (dependent) variable (Hayes, 2019). In the forward selection procedure, the model starts with no variable(s) and then tests each variable added to the equation until the variables added to the model are deemed most statistically significant, in order of importance, in influencing the outcome (dependent) variable(s) (Hayes, 2019). In the current study, the stepwise regression analyses were conducted with each dependent variable, namely depression, anxiety, and stress, to determine which variable, or combination of variables, practically and/or

statistically significantly predicts mental health amongst the sample of undergraduate university students.

3.7. Ethical Considerations

Secondary data analyses of an existing data set were conducted in this study. Ethical clearance for the original research project, "*Predictors of psychological well-being amongst university students*", was obtained with ethics number UFS-HSD2017/1313. Ethical clearance for the current study was also obtained from the General Human Research Ethics Committee (GHREC) at the University of the Free State (Ethics number: UFS-HSD2021/1785) (see Appendix B). Permission was also obtained to use the original researcher's existing data. When using an existing data set, caution and ethical consideration that should also be considered includes, but are not limited to, the original consent obtained from participants, the confidentiality and anonymities of the sample, and the period that the data has been kept for. In the current study, confidentiality and anonymity were preserved, and the initial consent provided was respected and considered (Tripathy, 2013). The data was originally collected in 2018. Thus, the data has not been kept for an exceptionally lengthy period or for a longer period as needed (Tripathy, 2013). The participants were also not at any additional risk using the originally collected data (Damyanov, 2023).

With regard to the initial data collection, the participants' confidentiality, including beneficence and non-maleficence principles, was adhered to during data collection to avoid any possible harm to the participants (Allan, 2015). Informed consent was obtained after informing participants that the study was anonymous and voluntary and that the participants could withdraw from the research project at any stage (see Appendix C). The participants' identities were kept anonymous. This was ensured by using a coding system and protecting their data through a password-protected document to which the researcher(s) had exclusive access. Permission was also obtained to store and report the data anonymously. Student

Counselling and Development Services at the UFS were available if any of the participants experienced distress due to the research project.

3.8. Summary

This chapter focused on the relevant research methodology used in the current research study, providing a general overview of the research aim and research questions. The research design and methods used in the study were also explained, including the research sample used. Furthermore, the chapter discussed and explained the data collection and measurement scales used: MTUAS, DASS, and a biographical questionnaire. Lastly, the specific statistical procedures and data analysis of the research study were addressed, and the relevant ethical considerations applicable to the study were elaborated on.

CHAPTER FOUR

RESULTS

4.1. Introduction

This chapter encompasses the results obtained from the statistical analyses conducted using the SPSS programme, as discussed in Chapter Three. As a starting point, an elaboration on the sample's descriptive statistics will be presented in terms of the frequency distribution of the participant's relevant demographical variables. Thereafter, the means, standard deviations, skewness, kurtosis, and internal consistencies for the MTUAS and DASS scales will be discussed. Subsequently, the correlation analysis results of the relevant variables will be addressed, followed by the hierarchical regression analyses conducted for each subscale of the criterion variable: Depression, Anxiety, and Stress. Furthermore, a discussion on the outcomes of the stepwise regression analyses on each subscale of the criterion variable will also be presented, only focusing on medium to large effect sizes. An effect size of .10 is considered small, .30 medium, and .50 large in the context of correlations, as stated by Steyn (2005). Furthermore, the results of the hierarchical regression analyses for the criterion variable, namely Mental Health, will be scrutinised. Only results demonstrating at least a medium effect size and statistical significance will be presented and discussed. An effect size of .02 is considered small, .15 medium, and .35 large (Cohen, 1992). Throughout the data analyses, the 1% level and the 5% level of significance were used.

4.2. Descriptive Statistics of the Sample

As mentioned in Chapter Three, the sample comprised 1 191 undergraduate students from the University of the Free State. The undergraduate university students were of different ages, ethnic groups, cultures, years of study, main majors, religious affiliations, generational statuses, educated families, and provinces, among other inclusion criteria.

The frequencies for the research sample (see Table 1) are calculated according to their sex, ethnicity, culture, year of study, main major, living arrangement, religious affiliation, generational status, relationship status, province, education of parents, happiness at university and satisfaction with university. Subsequently, an elaboration on these descriptive statistics will be provided.

Table 1

Frequency Distribution of Participants according to Demographic Variables

Biographical Variable	***n***	**%**
Sex		
Male	268	22.5
Female	923	77.5
Ethnicity		
Black	984	82.6
Coloured	49	4.1
White	153	12.8
Asian	1	.1
Indian	4	.3
Home Language		
South Sotho	389	32.7
North Sotho	41	3.4
Xhosa	107	9.0
Zulu	339	28.5
Tswana	132	11.1
English	49	4.1
Afrikaans	134	11.3
Year of Study		
First year	29	2.4
Second year	596	50.0
Third year	439	36.9
Fourth year	72	6.0
Other	55	4.6
Main major		
Psychology	759	63.7
Criminology	62	5.2
Sociology	35	2.9
Anthropology	2	.2
Political Science	16	1.3
Industrial Psychology	91	7.6
Communication Science	25	2.1
Education	33	2.8
Languages	30	2.5
Social Work	26	2.2
Other	112	9.4
Living arrangement		
Campus hostel	156	13.1
Hostel of campus	226	19.0
Home with parents	210	17.6
Flat in town	146	12.3
Student house	289	24.3
Other	164	13.8

Biographical Variable	*n*	%
Religious affiliation		
No religion	46	3.9
Christianity	1071	89.9
Judaism	2	.2
Islam	5	.4
Buddhism	2	.2
Hindu	1	.1
Other	64	5.4
Generational status		
First-generation student	539	45.3
Continuous generation student	652	54.7
Relationship status		
Single	587	49.3
In a relationship	536	45.0
Married	16	1.3
Divorced	3	.3
Separated	6	.5
Other	43	3.6
Province		
Eastern Cape	75	6.3
Free State	507	42.6
Gauteng	66	5.5
KwaZulu-Natal	291	24.4
Limpopo	41	3.4
Mpumalanga	27	2.3
Northern Cape	67	5.6
North West	36	3.0
Western Cape	24	2.0
Other	57	4.8
Education of parents		
Neither parents	572	48.0
Mother only	209	17.5
Father only	102	8.6
Both parents	252	21.2
Do not know	56	4.7
Happiness at university		
I am enthusiastic about it	342	28.7
I like it	496	41.6
I am more or less neutral about it	317	26.6
I do not like it	36	3.0
Same institution		
Yes, definitely	340	28.5
Probably yes	398	33.4
Probably no	299	25.1
No, definitely not	154	12.9

The majority of the sample consisted of female participants. A total of 77.5% (*n*=923) were female participants compared to 22.5% (*n*=268) being male participants. The data on the age of the participants was continuous in nature. The average age of the participants was 22.12 years (*SD* = 2.65). In terms of the sample's ethnicity, participants who identified as Black were the largest (82.6%; *n*=984) of the sample, followed by the second largest ethnicity group being participants who identified as White (12.8%; *n*=153). The ethnicity

group that was presented the smallest was participants who identified as Asian (0.1%; *n*=1). Other ethnicity groups included Coloured (4.1%; *n*=49) and Indian (.3%; *n*=4). In terms of the home language frequency distribution, the South Sotho language was the largest, with 32.7% (*n*=389) of the participants, followed by the Zulu language with 28.5% (*n*=339). The other languages presented in the sample included North Sotho (3.4%; *n*=41), Xhosa (9.0%; *n*=107), Tswana (11.1%; *n*=132), English (4.1%; *n*=49), and Afrikaans (11.3%; *n*=134).

The majority of the sample was enrolled in their second year of study, followed by the third year of study, which was the second largest, 50.0% (*n*=596) and 36.9% (*n*=439), respectively. The smallest presented year of study was participants enrolled in their first year (2.4%; *n*=29). With regard to the participants' main majors in their studies, the largest major presented was Psychology at 63.7% (*n*=759). The smallest major presented was Anthropology (0.2%; *n*=2). Equally presented majors were Sociology and Education at 2.9% (*n*=35) and 2.8% (*n*=33), respectively. Other majors presented included but were not limited to Criminology (5.2%; *n*=62), Industrial Psychology (7.6%; *n*=91), and Social Work (2.2%; *n*=26). The majority of the participants in the sample lived in a student house (24.3%; *n*=289), followed by the second largest living arrangement reported by participants who resided in a hostel off campus (19%; *n*=226). The smallest proportion of the participants reported residing in a flat in town (12.3%; *n*=146).

The religious affiliation of participants was also considered. A total of 1071 (*n*) participants reported being of Christian affiliation, representing 89.9% of the sample. The smallest reported religious affiliation was reported by only one (*n*=1) participant, namely Hindu affiliation (.1%). Judaism and Buddhism religious affiliations were equally represented at .2% of the sample (*n*=2). Regarding the participant's relationship status, the sample was more or less equally represented between participants being in a relationship and contrarily

being single, with 45% (*n*=536) and 49.3% (*n*=587), respectively. Only three participants (*n*=3) reported being divorced (0.3%).

In terms of the sample's presentation of generational status, the participants were primarily continuous-generation students (54.7%; *n*= 652) compared to 45.3% (*n*=539) being first-generation students. Regarding the education of the participant's parents, most of the participants reported that neither parent had received tertiary education (48.0%; *n*=572), compared to a significantly lower percentage reporting that both parents received tertiary education (21.2%; *n*=252). Furthermore, the distribution showed 17.5% (*n*=209) of the participants' mothers who received tertiary education and 8.6% (*n*=102) of the participants' fathers who received tertiary education individually. A total of 4.7% (*n*=56) of the participants reported that they did not know their parent's educational background. With regards to the sample's province of origin, the different provinces were largely represented. The largest percentage of the sample reported being from the Free State (42.6%; *n*=507), followed by KwaZulu-Natal (24.4%; *n*=291). The smallest presentation of provinces was Mpumalanga (2.3%; *n*=27), followed by the second smallest presentation, the Western Cape (2%; *n*=24). Other provinces reported were Eastern Cape (6.3%; *n*=75), Northern Cape (5.6%; *n*=67), Gauteng (5.5%; *n*=66), Limpopo (3.4%; *n*=41), and North West (3%; *n*=36). From the sample, 4.8% (*n*=57) of the participants reported being from provinces other than those provided and discussed.

Also, in terms of the sample's distribution of happiness at the university, 41.6% (*n*=496) of the participants reported that they like it, 28.7% (*n*=342) reported that they are enthusiastic about it, 26.6% (*n*=317) reported being more or less neutral about it, while 3% (*n*=36) reported not liking it. Lastly, there was an almost even presentation of participants who would definitely choose the same institution and those who reported that they would probably not choose the same institution: 28.5% (*n*=340) and 25.1% (*n*=299), respectively.

The majority of the sample reported that they would probably choose the same institution again (33.4%; *n*=398), compared to the smallest number of students reporting that they would definitely not choose the same institution again (12.9%; *n*=154).

4.3. Means, Standard Deviations, Skewness, Kurtosis, and Internal Consistencies of the Various Measurement Scales

Table 2 indicates the means, standard deviations, skewness, kurtosis, and internal consistencies of the various dimensions and subscales of the MTUAS and the DASS for the total group of participants. Cronbach's alpha coefficient (α) was calculated to indicate the internal consistency of the subscales.

Table 2

Descriptive Statistics and Reliability Coefficients for the DASS Subscales, MTUAS Subscales, MTUAS Dimensions, and MTUAS Attitudes Subscales

Measures	*N*	*M*	*SD*	α	Skewness	Kurtosis
DASS						
Depression	1191	36.0680	12.53739	.940	-.236	-1.146
Anxiety	1191	36.3728	11.38222	.913	-.304	-.955
Stress	1191	40.1243	10.66375	.916	-.708	-.281
MTUAS						
E-mailing	1191	6.0848	2.35831	.909	.432	-.864
Text messaging	1191	7.4055	2.01512	.734	-.376	-.644
Phone calling	1191	6.9207	2.38698	.745	-.213	-.931
Smartphone usage	1191	6.4856	2.09700	.896	.352	-.795
TV viewing	1191	5.1381	2.92203	.860	.477	-.995
Media sharing	1191	5.1333	2.76497	.910	.609	-.820
Internet searching	1191	5.9106	2.64426	.905	.287	-1.089
Video gaming	1191	4.2527	3.12895	.899	.768	-.744
General social media usage	1191	6.0249	2.42431	.941	.186	-.776
Online friendships	1191	4.2872	3.21640	.878	1.095	-.048
Facebook friendships	1191	6.3023	2.75173	.827	.051	-.545
Dimensions						
Media usage for social engagement	1191	5.2947	2.75560	.884	.886	.053
Media usage for communication	1191	6.3318	1.94155	.949	.642	-.465
Media usage for leisure	1191	5.6056	2.29164	.954	.687	-.397
Attitudes subscales						
Positive attitudes	1191	3.6709	.67421	.814	-.084	-.179
Media anxiety/Dependence	1191	3.3440	.88766	.779	-.205	.039
Negative attitudes	1191	3.2849	.73016	.674	.029	.469
Preference for task switching	1191	3.0842	.58894	.689	.060	.593

It is evident from Table 2 that the Cronbach alpha coefficients for the DASS subscales, MTUAS subscales, MTUAS dimensions, and MTUAS Attitudes subscales range

from .674 to .954. These scales displayed acceptable to exceptional levels of internal consistency (Vogt, 2005) and were thus all included in the subsequent analyses. In order to simplify the statistical analyses, the researcher grouped the MTUAS usage subscales into three dimensions, as done in previous studies (Cronje, 2019; Maoela, 2022; Nel, 2021; Van Tonder, 2020; Van Tonder et al., 2023). The three dimensions included the following: (i) Media usage for social engagement (online friendships, Facebook friendships) (MUSE), (ii) Media usage for communication (e-mailing, text messaging, phone calling, smartphone usage, media sharing) (MUC), and (iii) Media usage for leisure (TV viewing, internet searching, video gaming, general social media usage) (MUL). These three dimensions also displayed acceptable to exceptional levels of internal consistency, ranging from .844 to .954. As part of the descriptive statistics in Table 2, the researcher investigated whether the data was normally distributed by calculating the skewness and kurtosis values of the different subscales. According to Kahane (2008), the cut-off point for skewness is > |2| and kurtosis > |4|. Table 2 shows that the scores on all the subscales are within these cut-off points and, thus, do not deviate substantially from normality.

4.4. Correlations

Before conducting the regression analyses, the Pearson Product Moment correlation coefficients were calculated for the independent (predictor) variables, namely Media and Technology Usage (e.g., MUSE, MUC, MUL), Attitudes towards Media and Technology (e.g., Positive Attitudes, Media Anxiety/Dependence, Negative Attitudes, Preference for Task Switching), and biographical variables (e.g., Sex, Generational Status), as well as the dependent (outcome) variable, namely Mental Health (e.g., Depression, Anxiety, Stress). All the assumptions of correlational analyses were met. The correlation coefficients can be viewed in Table 3.

Table 3

Correlations between the DASS Subscales, MTUAS Dimensions, MTUAS Attitudes Subscales, Sex, and Generational Status (N=1191)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Depression	-	.839**	.827**	.168**	.149**	.212**	-.157**	.089**	.031	.150**	-.047	-.030
2. Anxiety		-	.841**	.160**	.148**	.204**	-.144**	.113**	.030	.195**	-.028	-.050
3. Stress			-	.086**	.080**	.129**	-.080**	.129**	.079**	.131**	.000	.007
4. MUSE				-	.687**	.743**	-.273**	-.049	-.126**	.011	-.138**	-.083**
5. MUC					-	.856**	-.128**	.041	-.116**	.079**	-.056	-.096**
6. MUL						-	-.136**	.080**	-.089**	.064*	-.100**	-.095**
7. PA							-	.547**	.027	.195**	.044	-.012
8. MAD								-	.000	.158**	.027	.008
9. NA									-	.146**	.040	.026
10. PTS										-	-.049	-.014
11. Sex											-	.108**
12. Generation												-

Key: MUSE = Media Usage for Social Engagement, MUC = Media Usage for Communication, MUL = Media Usage for Leisure, PA = Positive Attitudes, MAD = Media Anxiety/Dependence, NA = Negative Attitudes, PTS = Preference for Task Switching

**p≤.01, *p≤.05

Table 3 indicates that none of the correlations was practically significant. However, some correlations were statistically significant, and these statistically significant correlations will be discussed below. Table 3 indicates a statistically significant positive correlation between Depression and Media Usage for Engagement. This correlation is statistically significant at the 1% level. This finding seems to suggest that those university students who made more use of media and technology for engagement purposes have higher levels of depression. This finding may also suggest that university students with lower levels of depression are less inclined to use media and technology for engagement purposes. However, the corresponding effect size (.17) indicates that this finding is of little practical significance. Table 3 also indicates a statistically significant positive correlation between Depression and Media Usage for Communication. This correlation is statistically significant at the 1% level. This finding suggests that those university students who made more use of media and technology for communication purposes seem to have higher levels of depression. This finding may also suggest that university students with lower levels of depression are less inclined to use media and technology for communication purposes. However, the corresponding effect size (.15) indicates that this finding is of little practical significance. Additionally, Table 3 indicates a statistically significant positive correlation between Depression and Media Usage for Leisure. This correlation is statistically significant at the 1% level. This finding suggests that those university students who made more use of media and technology for leisure purposes seem to have higher levels of depression. This finding may also suggest that university students with lower levels of depression seem less inclined to use media and technology for leisure purposes. However, the corresponding effect size (.21) indicates that this finding is of little practical significance.

Furthermore, Table 3 indicates a statistically significant negative correlation between Depression and Positive Attitudes. This correlation is statistically significant at the 1% level. This

finding seems to suggest that university students who tend to have more positive attitudes towards media and technology have lower levels of depression. This finding may also suggest that university students with higher levels of depression seem to have fewer positive attitudes towards media and technology. However, the corresponding effect size (.16) indicates that this finding is of little practical significance. Table 3 indicates that there is a statistically significant positive correlation between Depression and Media Anxiety/Dependence. This correlation is statistically significant at the 1% level. This finding suggests that university students who tend to exhibit media anxiety/dependence seem to have higher levels of depression. This finding may also suggest that university students who have lower levels of depression seem to exhibit less media anxiety/dependence. However, the corresponding effect size (.09) indicates that this finding is of little practical significance. Table 3 also indicates a statistically significant positive correlation between Depression and Preference for Task Switching. This correlation is statistically significant at the 1% level. This finding seems to suggest that university students who tend to have a preference to switch tasks have higher levels of depression. This finding may also suggest that university students who have lower levels of depression seem to be less inclined to have preferences for task switching. However, the corresponding effect size (.15) indicates that this finding is of little practical significance.

Table 3 further indicates a statistically significant positive correlation between Anxiety and Media Usage for Engagement. This correlation is statistically significant at the 1% level. This finding seems to suggest that those university students who made more use of media and technology for engagement purposes seem to have higher levels of anxiety. This finding may also suggest that university students with lower levels of anxiety are less inclined to use media and technology for engagement purposes. However, the corresponding effect size (.16) indicates that this finding is of little practical significance. Table 3 also indicates a statistically significant

positive correlation between Anxiety and Media Usage for Communication. This correlation is statistically significant at the 1% level. This finding suggests that those university students who made more use of media and technology for communication purposes seem to have higher levels of anxiety. This finding may also suggest that university students with lower levels of anxiety are less inclined to use media and technology for communication purposes. However, the corresponding effect size (.15) indicates that this finding is of little practical significance. Moreover, Table 3 indicates a statistically significant positive correlation between Anxiety and Media Usage for Leisure. This correlation is statistically significant at the 1% level. This finding suggests that those university students who made more use of media and technology for leisure purposes have higher levels of anxiety. This finding may also suggest that university students with lower levels of anxiety seem less inclined to use media and technology for leisure purposes. However, the corresponding effect size (.20) indicates that this finding is of little practical significance.

Moreover, Table 3 indicates a statistically significant negative correlation between Anxiety and Positive Attitudes. This correlation is statistically significant at the 1% level. This finding seems to suggest that university students who tend to have more positive attitudes towards media and technology have lower levels of anxiety. This finding may also suggest that participants with higher levels of anxiety seem to have fewer positive attitudes towards media and technology. However, the corresponding effect size (.14) indicates that this finding is of little practical significance. Table 3 indicates that there is a statistically significant positive correlation between Anxiety and Media Anxiety/Dependence. This correlation is statistically significant at the 1% level. This finding seems to suggest that university students who tend to exhibit media anxiety/dependence have higher levels of anxiety. This finding may also suggest that university students who have lower levels of anxiety exhibit less media anxiety/dependence. However, the

corresponding effect size (.11) indicates that this finding is of little practical significance. Additionally, Table 3 indicates a statistically significant positive correlation between Anxiety and Preference for Task Switching. This correlation is statistically significant at the 1% level. This finding seems to suggest that university students who tend to have a preference to switch tasks have higher levels of anxiety. This finding may also suggest that university students who have lower levels of anxiety seem to be less inclined to have preferences for task switching. However, the corresponding effect size (.20) indicates that this finding is of little practical significance.

Furthermore, Table 3 indicates a statistically significant positive correlation between Stress and Media Usage for Engagement. This correlation is statistically significant at the 1% level. This finding suggests that university students who use media and technology more for engagement purposes have higher stress levels. This finding may also suggest that university students with lower levels of stress seem less inclined to use media and technology for engagement purposes. However, the corresponding effect size (.09) indicates that this finding is of little practical significance. Table 3 also indicates a statistically significant positive correlation between Stress and Media Usage for Communication. This correlation is statistically significant at the 1% level. This finding seems to suggest that university students who use media and technology more for communication purposes seem to have higher stress levels. This finding may also suggest that university students with lower levels of stress seem less inclined to use media and technology for communication purposes. However, the corresponding effect size (.08) indicates that this finding is of little practical significance. Additionally, Table 3 indicates a statistically significant positive correlation between Stress and Media Usage for Leisure. This correlation is statistically significant at the 1% level. This finding seems to suggest that university students who use media and technology more for leisure purposes seem to have higher stress levels. This finding may also suggest that university students with lower levels of stress seem less

inclined to use media and technology for leisure purposes. However, the corresponding effect size (.13) indicates that this finding is of little practical significance.

Furthermore, Table 3 indicates a statistically significant negative correlation between Stress and Positive Attitudes. This correlation is statistically significant at the 1% level. This finding suggests that university students who tend to have more positive attitudes towards media and technology seem to have lower stress levels. This finding may also suggest that participants with higher levels of stress seem to have fewer positive attitudes towards media and technology. However, the corresponding effect size (.08) indicates that this finding is of little practical significance. Table 3 also indicates a statistically significant positive correlation between Stress and Media Anxiety/Dependence. This correlation is statistically significant at the 1% level. This finding seems to suggest that university students who tend to exhibit media anxiety/dependence seem to have higher levels of stress. This finding may also suggest that university students who have lower levels of stress seem to exhibit less media anxiety/dependence. However, the corresponding effect size (.13) indicates that this finding is of little practical significance. Additionally, Table 3 indicates a statistically significant positive correlation between Stress and Negative Attitudes. This correlation is statistically significant at the 1% level. This finding suggests that university students who tend to have negative attitudes towards media and technology seem to have higher stress levels. This finding may also suggest that university students with lower stress levels seem to have less negative attitudes towards media and technology. However, the corresponding effect size (.08) indicates that this finding is of little practical significance. Lastly, Table 3 indicates a statistically significant positive correlation between Stress and Preference for Task Switching. This correlation is statistically significant at the 1% level. This finding suggests that university students who prefer to switch tasks have higher stress levels. This finding may also suggest that university students with lower stress

levels seem less inclined to have preferences for task switching. However, the corresponding effect size (.13) indicates that this finding is of little practical significance.

Next, the results of the hierarchical regression analyses will be discussed.

4.5. Hierarchical Regression Analyses

The proportion of the variance in Mental Health (e.g., Depression, Anxiety, Stress) accounted for by the independent (predictor) variables (e.g., Media and Technology Usage, Attitudes towards Media and Technology, demographic variables) were investigated. Mental Health was measured using three different subscales: Depression, Anxiety, and Stress. All the assumptions of regression analyses (i.e., sample size, normality, multi-collinearity, normality, linearity, and homoscedasticity of residuals) were investigated, and none of the assumptions were violated. Three hierarchical regression analyses were conducted with one of the DASS subscales as the criterion variable. Firstly, the percentage in the variance of Depression explained by these independent variables will be discussed.

4.5.1. Hierarchical Regression Analysis with Depression as the Criterion Variable

The results of the hierarchical regression analysis with Depression as the criterion variable are reported in Table 4.

Table 4

Contributions of MTUAS Dimensions, MTUAS Attitudes Subscales, Sex, and Generational Status to R^2 with Depression as the Criterion Variable

Variables in equation	R^2	*Contribution to R^2: full minus reduced model*	*F*	f^2
1. [Gender + GS] + [MUSE + MUC + MUL] + [PA + MAD + NA + PTS]	.123	1-6=.073	24.57611**	.08
2. [Gender + GS] + [MUSE + MUC + MUL] + PA	.066	2-6=.016	20.28266**	.02
3. [Gender + GS] + [MUSE + MUC + MUL] + MAD	.056	3-6=.006	7.525424**	.01
4. [Gender + GS] + [MUSE + MUC + MUL] + NA	.052	4-6=.002	2.49789	-
5. [Gender + GS] + [MUSE + MUC + MUL] + PTS	.070	5-6=.020	25.46237**	.02
6. [Gender + GS] + [MUSE + MUC + MUL]	.050			
7. [Gender + GS] + [PA + MAD + NA + PTS] + [MUSE + MUC + MUL]	.123	7-11=.023	10.32421**	.03
8. [Gender + GS] + [PA + MAD + NA + PTS] + MUSE	.108	8-11=.008	10.60787**	.01
9. [Gender + GS] + [PA + MAD + NA + PTS] + MUC	.107	9-11=.007	9.273236**	.01
10. [Gender + GS] + [PA + MAD + NA + PTS] + MUL	.119	10-11=.019	25.51305**	.02
11. [Gender + GS] + [PA + MAD + NA + PTS]	.100			
12. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + [Gender + GS]	.123	12-15=.000	-	-
13. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + Gender	.123	13-15=.000	-	-
14. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + GS	.123	14-15=.000	-	-
15. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL]	.123			

Key: GS = Generation Status, MUSE = Media Usage for Social Engagement, MUC = Media Usage for Communication, MUL = Media Usage for Leisure, PA = Positive Attitudes, MAD = Media Anxiety/Dependence, NA = Negative Attitudes, PTS = Preference for Task Switching

**p≤.01, *p≤.05

It is evident from Table 4 that the combination of the independent variables accounts for 12.3% ($F_{9;1181} = 18.445$; $p \leq .001$) of the variance in the Depression scores of the sample. This finding is statistically significant at the 1% level. The corresponding effect size ($f^2 = .14$) suggests this finding is of medium practical significance. Table 4 further indicates that the Attitudes towards Media subscales (Positive Attitudes, Media Anxiety/Dependence, Negative Attitudes, and Preference for Task Switching) as a set (combination) of predictor variables account for 7.3% of the variance in the Depression scores of the university students. This finding is statistically significant at the 1% level, and the corresponding effect size ($f^2 = .08$) suggests that this finding is of little practical significance. Positive Attitudes, Media Anxiety/Dependence, and Preference for Task Switching respectively explain 1.6% ($F_{6;1184} = 20.28266$; $p \leq .01$; $f^2 = .02$), .6% ($F_{6;1184} = 7.525424$; $p \leq .01$; $f^2 = .01$), and 2.0% ($F_{6;1184} = 25.46237$; $p \leq .01$; $f^2 = .02$) of the variance in the participants' depression. The relevant effect sizes suggest that these findings are of limited practical significance.

According to Table 4, the Media and Technology Usage dimensions (MUSE, MUC, and MUL), as a set (combination) of predictor variables, account for 2.3% of the variance in the Depression scores of university students. This finding is statistically significant at the 1% level. The corresponding effect size ($f^2 = .03$) suggests that this finding is of little practical significance. MUSE, MUC, and MUL respectively explain .8% ($F_{7;1183} = 10.60787$; $p \leq .01$; $f^2 = .01$), .7% ($F_{7;1183} = 9.273236$; $p \leq .01$; $f^2 = .01$), and 1.9% ($F_{7;1183} = 25.51305$; $p \leq .01$; $f^2 = .02$) of the variance in the participants' depression. The relevant effect sizes suggest that these findings are of limited practical significance.

Next, the percentage in the variance of Anxiety explained by the independent variables will be discussed.

4.5.2. Hierarchical Regression Analysis with Anxiety as the Criterion Variable

The results of the hierarchical regression analysis with Anxiety as the criterion variable are reported in Table 5.

Table 5

Contributions of MTUAS Dimensions, MTUAS Attitudes Subscales, Sex, and Generational Status to R^2 with Anxiety as the Criterion Variable

Variables in equation	R^2	*Contribution to R^2: full minus reduced model*	*F*	f^2
1. [Gender + GS] + [MUSE + MUC + MUL] + [PA + MAD + NA + PTS]	.141	1-6=.095	32.65279**	.11
2. [Gender + GS] + [MUSE + MUC + MUL] + PA	.060	2-6=.014	17.63404**	.02
3. [Gender + GS] + [MUSE + MUC + MUL] + MAD	.056	3-6=.010	12.54237**	.01
4. [Gender + GS] + [MUSE + MUC + MUL] + NA	.048	4-6=.002	2.487395	-
5. [Gender + GS] + [MUSE + MUC + MUL] + PTS	.081	5-6=.035	45.09249**	.04
6. [Gender + GS] + [MUSE + MUC + MUL]	.046			
7. [Gender + GS] + [PA + MAD + NA + PTS] + [MUSE + MUC + MUL]	.141	7-11=.019	8.707412**	.02
8. [Gender + GS] + [PA + MAD + NA + PTS] + MUSE	.129	8-11=.007	9.507463**	.01
9. [Gender + GS] + [PA + MAD + NA + PTS] + MUC	.128	9-11=.006	8.139908**	.01
10. [Gender + GS] + [PA + MAD + NA + PTS] + MUL	.138	10-11=.016	21.95824**	.02
11. [Gender + GS] + [PA + MAD + NA + PTS]	.122			
12. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + [Gender + GS]	.141	12-15=.002	1.374854	-
13. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + Gender	.139	13-15=.000	-	-
14. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + GS	.141	14-15=.002	2.752037	-
15. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL]	.139			

Key: GS = Generation Status, MUSE = Media Usage for Social Engagement, MUC = Media Usage for Communication, MUL = Media Usage for Leisure, PA = Positive Attitudes, MAD = Media Anxiety/Dependence, NA = Negative Attitudes, PTS = Preference for Task Switching

**p≤.01, *p≤.05

It is evident from Table 5 that the combination of the independent variables accounts for 14.1% ($F_{9;1181} = 21.536$; $p \leq .001$) of the variance in the Anxiety scores of the sample. This finding is statistically significant at the 1% level, and the corresponding effect size ($f^2 = .16$) suggests that this finding is of medium practical significance. Table 4 further indicates that the Attitudes towards Media subscales (Positive Attitudes, Media Anxiety/Dependence, Negative Attitudes, and Preference for Task Switching) as a set (combination) of predictor variables account for 9.5% of the variance in the Anxiety scores of the university students. This finding is statistically significant at the 1% level. The corresponding effect size ($f^2 = .11$) suggests that this finding is of little practical significance. Positive Attitudes, Media Anxiety/Dependence, and Preference for Task Switching respectively explain 1.4% ($F_{6;1184} = 17.63404$; $p \leq .01$; $f^2 = .02$), 1.0% ($F_{6;1184} = 12.54237$; $p \leq .01$; $f^2 = .01$), and 3.5% ($F_{6;1184} = 45.09249$; $p \leq .01$; $f^2 = .04$) of the variance in the participants' anxiety. The relevant effect sizes suggest that these findings are of limited practical significance.

According to Table 5, the Media and Technology Usage dimensions (MUSE, MUC, and MUL) as a set (combination) of predictor variables account for 1.9% of the variance in the Anxiety scores of the university students. This finding is statistically significant at the 1% level. The corresponding effect size ($f^2 = .02$) suggests that this finding is of little practical significance. MUSE, MUC, and MUL respectively explain .7% ($F_{7;1183} = 9.507463$; $p \leq .01$; $f^2 = .01$), .6% ($F_{7;1183} = 8.139908$; $p \leq .01$; $f^2 = .01$), and 1.6% ($F_{7;1183} = 21.95824$; $p \leq .01$; $f^2 = .02$) of the variance in the participants' anxiety. The relevant effect sizes suggest that these findings are of limited practical significance.

Next, the percentage in the variance of Stress explained by the independent variables will be discussed.

4.5.3. Hierarchical Regression Analysis with Stress as the Criterion Variable

The results of the hierarchical regression analysis with Stress as the criterion variable are reported in Table 6.

Table 6

Contributions of MTUAS Dimensions, MTUAS Attitudes Subscales, Sex, and Generational Status to R^2 with Stress as the Criterion Variable

Variables in equation	R^2	*Contribution to R^2: full minus reduced model*	*F*	f^2
1. [Gender + GS] + [MUSE + MUC + MUL] + [PA + MAD + NA + PTS]	.081	1-6=.060	19.27639**	.07
2. [Gender + GS] + [MUSE + MUC + MUL] + PA	.025	2-6=.004	4.857436*	-
3. [Gender + GS] + [MUSE + MUC + MUL] + MAD	.034	3-6=.013	15.93375**	.01
4. [Gender + GS] + [MUSE + MUC + MUL] + NA	.028	4-6=.007	8.526749**	.01
5. [Gender + GS] + [MUSE + MUC + MUL] + PTS	.037	5-6=.016	19.67186**	.02
6. [Gender + GS] + [MUSE + MUC + MUL]	.021			
7. [Gender + GS] + [PA + MAD + NA + PTS] + [MUSE + MUC + MUL]	.081	7-11=.009	3.855277**	.01
8. [Gender + GS] + [PA + MAD + NA + PTS] + MUSE	.074	8-11=.002	2.555076	-
9. [Gender + GS] + [PA + MAD + NA + PTS] + MUC	.074	9-11=.002	2.555076	-
10. [Gender + GS] + [PA + MAD + NA + PTS] + MUL	.078	10-11=.006	7.698482**	.01
11. [Gender + GS] + [PA + MAD + NA + PTS]	.072			
12. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + [Gender + GS]	.081	12-15=.000	-	-
13. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + Gender	.081	13-15=.000	-	-
14. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL] + GS	.081	14-15=.000	-	-
15. [PA + MAD + NA + PTS] + [MUSE + MUC + MUL]	.081			

Key: GS = Generation Status, MUSE = Media Usage for Social Engagement, MUC = Media Usage for Communication, MUL = Media Usage for Leisure, PA = Positive Attitudes, MAD = Media Anxiety/Dependence, NA = Negative Attitudes, PTS = Preference for Task Switching

**p≤.01, *p≤.05

It is evident from Table 6 that the combination of the independent variables accounts for 8.1% ($F_{9;1181}$ = 11.622; $p \leq .001$) of the variance in the Stress scores of the sample. This finding is statistically significant at the 1% level. The corresponding effect size (f^2 = .09) suggests that this finding is of little practical significance. Table 6 further indicates that the Attitudes towards Media subscales (Positive Attitudes, Media Anxiety/Dependence, Negative Attitudes, and Preference for Task Switching) as a set (combination) of predictor variables account for 6.0% of the variance in the Stress scores of the university students. This finding is statistically significant at the 1% level. The corresponding effect size (f^2 = .07) suggests that this finding is of little practical significance. Positive Attitudes, Media Anxiety/Dependence, Negative Attitudes, and Preference for Task Switching respectively explain .4% ($F_{6;1184}$ = 4.857436; $p \leq .05$; f^2 = .00), 1.3% ($F_{6;1184}$ = 15.93375; $p \leq .01$; f^2 = .01), .7% ($F_{6;1184}$ = 8.526749; $p \leq .01$; f^2 = .01), and 1.6% ($F_{6;1184}$ = 19.67186; $p \leq .01$; f^2 = .02) of the variance in the participants' stress. The relevant effect sizes suggest that these findings are of limited practical significance.

According to Table 5, the Media and Technology Usage dimensions (MUSE, MUC, and MUL) as a set (combination) of predictor variables account for .9% of the variance in the Stress scores of the university students. This finding is statistically significant at the 1% level, and the corresponding effect size (f^2 = .01) suggests that this finding is of little practical significance. MUL explain .6% ($F_{7;1183}$ = 7.698482; $p \leq .01$; f^2 = .01) of the variance in the participants' stress. The relevant effect size suggests that this finding is of limited practical significance.

4.6. Stepwise Regression Analysis

Due to the fact that the hierarchical regression analyses did not deliver any practically significant findings for any of the individual independent variables, a decision was made to conduct stepwise regression analyses to determine the following:

- Which one of these nine independent variables explained the most variance of each of the criterion variables;
- Whether this independent variable explained a significant percentage of the variance of the criterion variable;
- If any of the remaining independent variables also explained a significant percentage of the variance of the criterion variable;
- If more than one independent variable was added to the regression equation and whether the combined set of independent variables explained a significant percentage of the variance.

In order to interpret the statistical results in terms of effect sizes, Steyn (2005) recommended that the following guidelines be used to interpret the proportional variance explained by the different independent variables: ρ^2 = .01 (small); ρ^2 = .10 (medium) and ρ^2 = .25 (large) effect. The 1% and 5% levels of significance were used. The analyses were performed independently for the three criterion variables (Depression, Anxiety, and Stress).

Next, the stepwise regression analysis with Depression as the criterion variable will be discussed.

4.6.1. Stepwise Regression Analysis with Depression as the Criterion Variable

The results of the stepwise regression analysis with Depression as the criterion variable are reported in Table 7.

Table 7

Stepwise Regression Analysis with Depression as the Criterion Variable

				Change statistics		
Step	Variable entered $N = 1191$	Partial R^2	Model R^2	F-value	Direction of relationships with Depression	Pr > F
1	MUL	.045	.045	55.864	Positive	<.001**
2	PTS	.018	.063	23.582	Positive	<.001**
3	PA	.026	.089	33.572	Negative	<.001**
4	MAD	.029	.118	38.353	Positive	<.001**
5	MUC	.004	.122	5.884	Positive	.015*

**p≤.01; *p≤.05

All nine predictor variables resulted in an explanation of a combined 12.3% ($F_{9;1181}$ = 18.445; p≤.001) of the variance in the Depression scores of the sample.

In Step 1 of the stepwise regression analysis, the independent variable, Media Usage for Leisure, was first entered into the regression equation and found to be significant on the 1% level of significance. Media Usage for Leisure accounted for 4.5% of the variance of Depression scores of the sample (F = 55.864, p≤.001). A positive correlation between Media Usage for Leisure and Depression was found. This finding seems to imply that university students who made more use of media and technology for leisure purposes seem to have higher levels of depression. However, the corresponding effect size ($\wp^2$ = .05) indicates that the result is not of any practical significance.

In Step 2, the independent variable, Preference for Task Switching, was added to the regression equation. Preference for Task Switching contributed an additional 1.8% to the variance of the Depression scores of the sample on the 1% level of significance (F = 23.582, p≤.001). The corresponding effect size ($\wp^2$ = .02) for the partial R^2 indicates that the contribution of Preference for Task Switching is not of practical importance. Combined, these two independent variables, Media Usage for Leisure and Preference for Task Switching, accounted for 6.3% (p≤.01) of the variance in the participants' Depression scores. The corresponding effect size ($\wp^2$ = .07) indicates that the contribution of these two independent

variables in combination is of no practical importance. A positive correlation was found between Preference for Task Switching and Depression, which might imply that university students who have higher preferences for task switching have higher levels of depression.

In Step 3, the independent variable, Positive Attitudes, was added to the regression equation. Positive Attitudes contributed an additional 2.6% ($F = 33.572$, $p \leq .001$) to the variance of the Depression scores of the sample. The corresponding effect size ($\wp^2 = .03$) for the partial R^2 indicates that the contribution of Positive Attitudes is not of practical importance. In Step 3, these three independent variables, Media Usage for Leisure, Preference for Task Switching, and Positive Attitudes, explained 8.9% ($p \leq .01$) of the variance in the Depression scores of the sample. The corresponding effect size ($\wp^2 = .10$) indicates that the contribution of these three independent variables in combination is of medium practical importance. The direction of the correlation between Positive Attitudes and Depression is negative, which suggests that university students who tend to have more positive attitudes towards media and technology have lower levels of depression.

In Step 4, the independent variable, Media Anxiety/Dependence, was added to the regression equation. Media Anxiety/Dependence contributed an additional 2.9% ($F = 38.353$, $p \leq .001$) to the variance of the Depression scores of the sample. The corresponding effect size ($\wp^2 = .03$) for the partial R^2 indicates that the contribution of Media Anxiety/Dependence is not of practical importance. In Step 4, these four independent variables, Media Usage for Leisure, Preference for Task Switching, Positive Attitudes, and Media Anxiety/Dependence, explained 11.8% ($p \leq .01$) of the variance in the Depression scores of the participants. The corresponding effect size ($\wp^2 = .13$) indicates that the contribution of these four independent variables in combination is of medium practical importance. The direction of the correlation between Media Anxiety/Dependence and Depression is positive, suggesting that university students who tend to exhibit more media anxiety seem to have higher levels of depression.

In the last step (Step 5), the independent variable, Media Usage for Communication, was added to the regression equation. Media Usage for Communication contributed an additional .4% ($F = 5.884$, $p \leq .05$) to the variance of the Depression scores of the participants. The corresponding effect size ($\wp^2 = .00$) for the partial R^2 indicates that the contribution of Media Usage for Communication is not of practical importance. In Step 5, these five independent variables, Media Usage for Leisure, Preference for Task Switching, Positive Attitudes, Media Anxiety/Dependence, and Media Usage for Communication, explained 12.2% ($p \leq .05$) of the variance in the Depression scores of the sample. The corresponding effect size ($\wp^2 = .14$) indicates that the contribution of these five independent variables in combination is of medium practical importance. The direction of the correlation between Media Usage for Communication and Depression is positive, which may suggest that university students who tend to use media and technology for communication have higher levels of depression.

From the discussion, it is evident that these five independent variables succeeded in explaining 12.2% of the total variance in Depression, whilst the remaining four variables (12.3%-12.2%=.1%) in combination only explained an additional .1% to the variance of Depression scores of the sample.

The stepwise regression analysis with Anxiety as the criterion variable will be discussed next.

4.6.2. Stepwise Regression Analysis with Anxiety as the Criterion Variable

The results of the stepwise regression analysis with Anxiety as the criterion variable are reported in Table 8.

Table 8

Stepwise Regression Analysis with Anxiety as the Criterion Variable

				Change statistics		
Step	Variable entered $N = 1191$	Partial R^2	Model R^2	F-value	Direction of relationships with Anxiety	Pr > F
1	MUL	.042	.042	51.824	Positive	<.001**
2	PTS	.033	.075	42.769	Positive	<.001**
3	PA	.025	.100	33.145	Negative	<.001**
4	MAD	.035	.135	48.624	Positive	<.001**
5	MUC	.003	.138	4.469	Positive	.035*

**p≤.01; *p≤.05

All nine predictor variables resulted in an explanation of a combined 14.1% ($F_{9;1181}$ = 21.536; p≤.001) of the variance in the Anxiety scores of the sample.

In Step 1 of the stepwise regression analysis, the independent variable, Media Usage for Leisure, was first entered into the regression equation and found to be significant on the 1% level of significance. Media Usage for Leisure accounted for 4.2% of the variance of the Anxiety scores of the sample (F = 51.824, p≤.001). A positive correlation between Media Usage for Leisure and Anxiety was found. This finding seems to imply that university students who use media and technology more for leisure purposes have higher levels of anxiety. The corresponding effect size ($\wp^2$ = .04) indicates that the result is not of any practical significance.

In Step 2, the independent variable, Preference for Task Switching, was added to the regression equation. Preference for Task Switching contributed an additional 3.3% to the variance of the Anxiety scores of the sample on the 1% level of significance (F = 42.769, p≤.001). The corresponding effect size ($\wp^2$ = .03) for the partial R^2 indicates that the contribution of Preference for Task Switching is not of practical importance. Combined, these two independent variables, Media Usage for Leisure and Preference for Task Switching, accounted for 7.5% (p≤.01) of the variance in the participants' Anxiety. The corresponding effect size ($\wp^2$ = .08) indicates that the contribution of these two independent variables in

combination is of no practical importance. A positive correlation was found between Preference for Task Switching and Anxiety, which might imply that university students who have higher preferences for task switching have higher levels of anxiety.

In Step 3, the independent variable, Positive Attitudes, was added to the regression equation. Positive Attitudes contributed an additional 2.5% ($F = 33.145$, $p \leq .001$) to the variance of the Anxiety scores of the sample. The corresponding effect size ($\wp^2 = .03$) for the partial R^2 indicates that the contribution of Positive Attitudes is not of practical importance. In Step 3, these three independent variables, Media Usage for Leisure, Preference for Task Switching, and Positive Attitudes explained 10.0% ($p \leq .01$) of the variance in the Anxiety scores of the sample. The corresponding effect size ($\wp^2 = .11$) indicates that the contribution of these three independent variables in combination is of medium practical importance. The direction of the correlation between Positive Attitudes and Anxiety is negative, suggesting that university students who tend to have more positive attitudes towards media and technology have lower levels of anxiety.

In Step 4, the independent variable, Media Anxiety/Dependence, was added to the regression equation. Media Anxiety/Dependence contributed an additional 3.5% ($F = 48.624$, $p \leq .001$) to the variance of the Anxiety scores of the sample. The corresponding effect size ($\wp^2 = .04$) for the partial R^2 indicates that the contribution of Media Anxiety/Dependence is not of practical importance. In Step 4, these four independent variables, Media Usage for Leisure, Preference for Task Switching, Positive Attitudes, and Media Anxiety/Dependence, explained 13.5% ($p \leq .01$) of the variance in the Anxiety scores of the participants. The corresponding effect size ($\wp^2 = .16$) indicates that the contribution of these four independent variables in combination is of medium practical importance. The direction of the correlation between Media Anxiety/Dependence and Anxiety is positive, which may suggest that university students who tend to exhibit more media anxiety have higher levels of anxiety.

In the last step (Step 5), the independent variable, Media Usage for Communication, was added to the regression equation. Media Usage for Communication contributed an additional .3% ($F = 4.469$, $p \leq .05$) to the variance of the Anxiety scores of the participants. The corresponding effect size ($\wp^2 = .00$) for the partial R^2 indicates that the contribution of Media Usage for Communication is not of practical importance. In Step 5, these five independent variables, Media Usage for Leisure, Preference for Task Switching, Positive Attitudes, Media Anxiety/Dependence, and Media Usage for Communication, explained 13.8% ($p \leq .05$) of the variance in the Anxiety scores of the sample. The corresponding effect size ($\wp^2 = .16$) indicates that the contribution of these five independent variables in combination is of medium practical importance. The direction of the correlation between Media Usage for Communication and Anxiety is positive, suggesting that university students who tend to use media and technology for communication have higher levels of anxiety.

From the discussion, it is evident that these five independent variables succeeded in explaining 13.8% of the total variance in Anxiety, whilst the remaining four variables (14.1%-13.8%=.3%) in combination only explained an additional .3% to the variance of Anxiety scores of the sample.

Next, the stepwise regression analysis with Stress as the criterion variable will be discussed.

4.6.3. Stepwise Regression Analysis with Stress as the Criterion Variable

The results of the stepwise regression analysis with Stress as the criterion variable are reported in Table 9.

Table 9

Stepwise Regression Analysis with Stress as the Criterion Variable

				Change statistics		
Step	Variable entered $N = 1191$	Partial R^2	Model R^2	F-value	Direction of relationships with Stress	Pr > F
1	PTS	.017	.017	20.761	Positive	<.001**
2	MUL	.015	.032	17.902	Positive	<.001**
3	MAD	.010	.042	12.829	Positive	<.001**
4	PA	.031	.073	39.227	Negative	<.001**
5	NA	.005	.078	6.807	Positive	.009**

**p≤.01; *p≤.05

All nine predictor variables resulted in an explanation of a combined 8.1% ($F_{9;1181}$ = 11.622; p≤.001) of the variance in the Stress scores of the sample.

In Step 1 of the stepwise regression analysis, the independent variable, Preference for Task Switching, was first entered into the regression equation and found to be significant on the 1% level of significance. Preference for Task Switching accounted for 1.7% of the variance of the Stress scores of the sample (F = 20.761, p≤.001). A positive correlation was found between Preference for Task Switching and Stress, implying that university students with higher preferences for task switching have higher stress levels. The corresponding effect size ($\wp^2$ = .02) indicates that the result is not of any practical significance.

In Step 2, the independent variable, Media Usage for Leisure, was added to the regression equation. Media Usage for Leisure contributed an additional 1.5% to the variance of the Stress scores of the sample on the 1% level of significance (F = 17.902, p≤.001). The corresponding effect size ($\wp^2$ = .02) for the partial R^2 indicates that the contribution of Media Usage for Leisure is not of practical importance. Combined, these two independent variables, Preference for Task Switching and Media Usage for Leisure, accounted for 3.2% (p≤.01) of the variance in the participants' Stress scores. The corresponding effect size ($\wp^2$ = .03) indicates that the contribution of these two independent variables in combination is of no practical importance. A positive correlation between Media Usage for Leisure and Stress was

found. This finding implies that university students who use media and technology more for leisure purposes have higher stress levels.

In Step 3, the independent variable, Media Anxiety/Dependence, was added to the regression equation. Media Anxiety/Dependence contributed an additional 1.0% (F = 12.829, $p \leq .001$) to the variance of the Stress scores of the sample. The corresponding effect size ($\wp^2$ = .01) for the partial R^2 indicates that the contribution of Media Anxiety/Dependence is not of practical importance. In Step 3, these three independent variables, Preference for Task Switching, Media Usage for Leisure, and Media Anxiety/Dependence, explained 4.2% ($p \leq .01$) of the variance in the Stress scores of the sample. The corresponding effect size ($\wp^2$ = .04) indicates that the contribution of these three independent variables in combination is of no practical importance. The direction of the correlation between Media Anxiety/Dependence and Stress is positive, which may suggest that university students who tend to exhibit more media anxiety seem to have higher levels of stress.

In Step 4, the independent variable, Positive Attitudes, was added to the regression equation. Positive Attitudes contributed an additional 3.1% (F = 39.227, $p \leq .001$) to the variance of the Stress scores of the sample. The corresponding effect size ($\wp^2$ = .03) for the partial R^2 indicates that the contribution of Positive Attitudes is not of practical importance. In Step 4, these four independent variables, Preference for Task Switching, Media Usage for Leisure, Media Anxiety/Dependence, and Positive Attitudes, explained 7.3% ($p \leq .01$) of the variance in the participants' Stress scores. The corresponding effect size ($\wp^2$ = .08) indicates that the contribution of these four independent variables in combination is of no practical importance. The direction of the correlation between Positive Attitudes and Stress is negative, suggesting that university students who tend to have more positive attitudes towards media and technology have lower levels of stress.

In the last step (Step 5), the independent variable, Negative Attitudes, was added to the regression equation. Negative Attitudes contributed an additional.5% ($F = 6.807$, $p \leq .01$) to the variance of the Stress scores of the participants. The corresponding effect size ($\wp^2 = .01$) for the partial R^2 indicates that the contribution of Negative Attitudes is not of practical importance. In Step 5, these five independent variables, Preference for Task Switching, Media Usage for Leisure, Media Anxiety/Dependence, Positive Attitudes, and Negative Attitudes, explained 7.8% ($p \leq .01$) of the variance in the Stress scores of the sample. The corresponding effect size ($\wp^2 = .08$) indicates that the contribution of these five independent variables in combination is of no practical importance. The direction of the correlation between Negative Attitudes and Stress is positive, which may suggest that university students who tend to have negative attitudes towards media and technology have higher levels of stress.

From the discussion, it is evident that these five independent variables succeeded in explaining 7.8% of the total variance in Stress, whilst the remaining four variables (8.1%-7.8%=.3%) in combination only explained an additional .3% to the variance of Stress scores of the sample.

4.7. Summary

This chapter presented and discussed the results of the statistical analyses. Firstly, the correlations between the independent (predictor) variables (i.e., Media and Technology Usage, Attitudes towards Media and Technology, sex, and generational status) and dependent variables (i.e., Depression, Anxiety, and Stress) were presented in Table 3, whereafter the statistically significant correlations were discussed. However, none of the correlations were found to be practically significant. Thereafter, the results from the hierarchical regression analyses were presented for each criterion variable (Depression, Anxiety, Stress) respectively. The results of the hierarchical regression analyses indicated that the combination of the independent (predictor) variables statistically significantly predicted

Depression and Anxiety, respectively, with both findings indicating medium practical significance. Subsequently, a stepwise regression analysis was also conducted to determine which predictor variable(s) succeeded in explaining the highest variance in depression, anxiety, and stress as the criterion variables.

In the stepwise regression analyses with Depression as the criterion variable, the findings indicated that five of the nine independent variables, namely Media Usage for Leisure, Preference for Task Switching, Positive Attitudes towards Media and Technology, Media Anxiety/Dependence, and Media Usage for Communication in combination statistically significantly contributed to the variance in Depression on the 1% level of significance. From the five predictor variables, Media Usage for Leisure individually accounted for the largest variance of Depression (4.5%). This finding implies that those students who made more use of media and technology for leisure purposes have higher levels of depression. Preference for Task Switching (1.8%), Positive Attitudes (2.6%), Media Anxiety/Dependence (2.9%), and Media Usage for Communication (.4%) statistically significantly contributed to the variance of Depression. However, none of these predictor variables, either individually or in combination, indicated findings that were of any practical significance. The corresponding effect size ($\rho^2 = .16$) indicated that the contribution of these five independent variables in combination was of medium practical importance and succeeded in explaining 12.2% of the total variance in Depression, whilst the remaining four predictor variables in combination only explained an additional .1% to the variance of Depression.

Regarding Anxiety, the results of the stepwise regression analyses indicated that five of the nine independent variables, namely Media Usage for Leisure, Preference for Task Switching, Positive Attitudes towards Media and Technology, Media Anxiety/Dependence, and Media Usage for Communication in combination statistically significantly contributed to the variance in Anxiety on the 1% level of significance. From the five predictor variables,

Media Usage for Leisure individually accounted for the largest variance of Anxiety (4.2%). This finding seems to imply that students who made more use of media and technology for leisure purposes have higher levels of anxiety. Preference for Task Switching (3.3%), Positive Attitudes towards Media and Technology (2.5%), Media Anxiety/Dependence (3.5%), and Media Usage for Communication (.3%) statistically significantly contributed to the variance of Anxiety. However, none of these predictor variables, either individually or in combination, indicated findings that were of any practical significance. The corresponding effect size (f^2 = .16) indicates that the contribution of these five independent variables in combination is of medium practical importance and succeeded in explaining 13.8% of the total variance in Anxiety, whilst the remaining four predictor variables in combination only explained an additional .3% to the variance of Anxiety.

Concerning Stress, the stepwise regression analysis results indicated that five of the nine independent variables, namely Preference for Task Switching, Media Usage for Leisure, Media Anxiety/Dependence, Positive Attitudes, and Negative Attitudes, made a statistically significant contribution to the variance of Stress on the 1% level of significance and was found to collectively explain 7.8% ($p \leq .01$) of the variance in the Stress scores of the sample. However, none of the five independent variables, either collectively or individually, indicated any practical significance in the prediction of Stress. Positive Attitudes individually accounted for the largest variance of Stress from the five predictor variables at 3.1%. Preference for Task Switching (1.7%), Media Usage for Leisure (1.5%), Media Anxiety/Dependence (1.0%), and Negative Attitudes (.5%) statistically significantly contributed to the variance of Stress. However, the results indicated that these variables were of no practical significance, individually or in combination.

In conclusion, this chapter provided a thorough and in-depth discussion of the results, addressing the findings and results relating to correlations, hierarchical regression analyses,

as well as stepwise regression analyses relating to each of the three criterion variables, namely depression, anxiety, and stress.

CHAPTER FIVE

DISCUSSION OF RESULTS, LIMITATIONS, RECOMMENDATIONS, AND CONCLUSION

5.1. Introduction

This chapter will focus on the results obtained and provided in Chapter Four. Only statistically and practically significant results will be discussed and interpreted with consideration of and in the context of existing literature on the relevant topic. Firstly, the statistically significant correlations between the relevant variables used in the study will be discussed. A discussion regarding the findings of the hierarchical regression analyses will follow this. Thereafter, a discussion will follow on the results of the stepwise regression analyses. The limitations of the current study and recommendations for future studies will be addressed, whereafter, the chapter will conclude with a conclusion on this chapter as well as the current research study in general.

5.2. Statistically Significant Correlations between Relevant Variables in the Study

In order to determine the relationships between the relevant independent (predictor) and dependent (outcome) variables, Pearson correlations were calculated. The results, as discussed in Chapter Four, indicated statistically significant correlations between the relevant predictor and outcome variables in the study. Regarding the level of significance, both the 1% and 5% levels of significance were considered. As mentioned in Chapter Four, the guidelines provided by Steyn (2005) regarding effect sizes were used (.10 = small; .30 = medium; .50 = large). As indicated by Table 3 (see Chapter Four), none of the correlations between the predictor and outcome variables were of any practical significance due to the small corresponding effect sizes. However, previous studies found significant correlations between the predictor and outcome variables analysed in the current study and will subsequently be addressed and discussed.

In terms of correlations between media and technology usage and mental health, previous studies have found both significant positive and negative correlations between media and technology usage and the mental health of university students (Lattie et al., 2019; Vallone et al., 2023; Yadav & Reddy, 2023). The advancement of media and technology has had a tremendous impact on the effectiveness and convenience of how students can conduct their studies, which has been found to have a beneficial impact in improving students' general mental health (Yadav & Reddy, 2023). Media and technology have broadened university students' opportunities to browse and access various online content that expands their knowledge and production of higher-quality academic work and performance (Vaingankar et al., 2022). Social media usage also provides students with the opportunity to reach out to others, receive extensive social support, and express their creativity and self-identity (Maher & Earl, 2019). These reported benefits and opportunities have been associated with improved mental health among university students (Maher & Earl, 2019; Vaingankar et al., 2022). Due to the ubiquitous nature of media and technology, the use thereof among university students has seen exponential growth (Adeyanju et al., 2021; Ahmad et al., 2018; Alonzo et al., 2021; Bettmann et al., 2020; Elhai et al., 2017; Ezoe et al., 2019; Kaya et al., 2020; Kolhar et al., 2021). However, this rapid growth in media and technology usage has become concerning since it has also been associated with decreased mental health among university students (Adeyanju et al., 2021; Bettmann et al., 2020). Excessive and/or frequent media usage for a variety of purposes, as well as the usage of multiple technological devices, have been associated with decreased mental health among university students (Yadav & Reddy, 2023). Yadav and Reddy (2023) provided possible reasons for the decrease in mental health among university students, which include reported social isolation, loneliness, decreased mindfulness, increased distractions, and media and technology addiction, all contributing to increased levels of mental illness (e.g., depression, anxiety, and stress). These findings were

also attested to in studies conducted by Waqas et al. (2018) and Lin et al. (2016) amongst a sample of 155 and 1787 university students, respectively, that found that increased media and technology usage among university students is associated with increased mental illness (e.g., depression, anxiety and stress).

With regard to associations between attitudes toward media and technology and mental health, previous studies indicate that media and technology also benefit students' mental health, especially those who have a positive attitude towards media and technology usage (Berryman et al., 2018). With the current ubiquitous nature of media and technology, some students have a positive attitude towards media and technology usage and perceive it as a useful tool and beneficial for gathering information, reaching out, and conducting their studies effectively (Chakraborty et al., 2020; Fuady et al., 2021). This positive attitude toward media and technology has been associated with a significant increase in their mental health (i.e., depression, anxiety, and stress) (Bolatov et al., 2020). However, excessive media and technology usage and dependence on it have become a major concern among the university student population due to the inevitable impact thereof on their mental health and general well-being (Alotaibi et al., 2022; Sabbah et al., 2019). Zhang et al. (2020) found that media dependence is associated with increased mental illness among students. Moreover, it has been found that increased media anxiety is also associated with increased mental illness among university students (Alotaibi et al., 2022; Zhu & Xiong, 2022). It has also been reported that task switching has significantly increased, encompassing various activities and technology devices. This surge is attributed to the growing distractions and myriad possibilities offered by different applications, media platforms, and technological devices. This phenomenon is associated with decreased mental health in students (Wiradhany & Koerts, 2019).

Furthermore, considering biological sex and mental health within the student population, considerable attention has been given to the distinctions in life experiences and

mental health between male and female students (Birech, 2023; Burger & Rocha, 2023; Riecher-Rössler, 2017). Some studies highlight the inconsistencies in the findings regarding the role that biological sex plays in the mental health of university students (Burger & Rocha, 2023). There is well-documented evidence that female students are more susceptible to poor mental health compared to their male counterparts, highlighting biological sex as a possible predisposing or risk factor for mental illness (Fusco, 2017; Hjorth et al., 2016; Nogueira et al., 2021; Volkov & Abaturova, 2022). However, Inman (2017) and Panda and Azeem (2022) indicated that biological sex is not significantly associated with students' mental health or the effectiveness of their general adjustment to tertiary education. Notably, Davies et al. (2016) and Seehuus et al. (2019) found that male students are less aware of mental health issues and less inclined to seek professional help for such concerns.

Finally, regarding the correlations between the generational status of students and mental health, previous studies indicated that first-generation students experience significantly lower levels of mental health, regardless of the institution they attended (Bui, 2023; Lipson et al., 2023; Stebleton et al., 2014; Wang et al., 2022). On the contrary, Pease (2015) found that first-generation students did not have lower levels of mental health compared to non-first-generation students. Homick (2023) also argued that students' generational status is not a significant predictor of their mental health and that emotional and social support should rather be regarded as significant predictors of students' mental health.

5.3. Discussion on the Predictors of Mental Health

The proportion of the variance in Mental Health (e.g., Depression, Anxiety, Stress) accounted for by the independent (predictor) variables (e.g., Media and Technology Usage, Attitudes towards Media and Technology, Sex, and Generational Status) were investigated. Hierarchical regression analyses were conducted to investigate the contribution of the predictor variables, as a set (combination) and individually, to the proportion of variance in

the outcome variables. Three hierarchical regression analyses were conducted with each one of the DASS subscales as the outcome variable, namely Depression, Anxiety, and Stress. The results indicated that the combination (set) of the predictor variables adequately explained the percentage of variance of the subscales of Mental Health (i.e., Depression, Anxiety, and Stress) and indicated statistically significant results. However, only the variance explained in two mental health subscales, namely Depression and Anxiety, indicated practically significant results. With regard to Stress as the third subscale of mental health, only statistically significant results were found, and due to small effect sizes, no practical significant results were found and will therefore not be discussed further.

With Depression as the dependent (criterion) variable and the first subscale of mental health, the results from the hierarchical regression analyses indicated that the combination of all nine independent variables accounted for 12.3% ($F_{9;1181} = 18.445$; $p \leq .001$) of the variance in the Depression scores of the sample. This finding is statistically significant on the 1% level, and the corresponding effect size ($f^2 = .14$) suggests that this finding is of medium practical significance. Therefore, this result practically indicates that 12.3% of the variance in the Depression score of the university students can be explained by the combination of their media and technology usage, their attitudes towards media and technology, sex, and generational status. To the researcher's knowledge, no previous studies are available that used the same combination of predictor variables as in the current study. Therefore, a combination of previous studies that used the same variables will be considered and discussed with Depression as the outcome variable.

In a previous study by Pedroza (2017), these results were attested to, indicating that increased and excessive media and technology usage is associated with increased depression amongst university students, providing the recommendation that students should rather utilise media and technology for productive and academic purposes and resort to physical activities

when it comes to leisure. Similar findings and recommendations are provided by Hummel (2022), suggesting that a decrease in media and technology usage could be beneficial as a protective measure against the reported increase in depressive symptoms among university students. Considering social media usage, Walsh (2022) and Braghieri et al. (2021) found significant positive correlations between social media usage and depression among university students. However, Liu et al. (2022) and Walsh (2022) caution against the actual causal effect of media and technology usage and depression reported among university students, stating that multiple factors and dynamics are at play that should be considered when determining the causal link between these variables.

Furthermore, concerning attitudes towards media and technology, previous studies have indicated that a positive attitude toward media and technology is associated with lower levels of depression (Liu et al., 2022). Students who perceive media and technology as a useful tool to work more effectively (Liu et al., 2022) and to stay up to date with important information and changes (Lattie et al., 2019) tend to report less depressive symptoms compared to students who have a negative attitude towards media and technology (Hwnag, 2019). Students with a negative attitude towards media and technology, students who tend to spend excessive amounts of time on media and technology (Brooks & Longstreet, 2015; Jeri-Yabar et al., 2018), and students who show dependence on media and technology also reported increased depressive symptoms (Leung et al., 2021; Liu et al., 2022).

Regarding sex and depression, previous studies provide inconsistent findings. Studies have found differences between male and female university students concerning depression, indicating that female students are more inclined to experience depression (Bowe, 2022; Müller et al., 2022). There are also previous findings indicating that there is no evidence of differences in levels of depression reported between male and female university students (Grant et al., 2002). However, it seems that the differences in reported levels of depression

between male and female students are narrowing down, with depression being prominent among students regardless of their biological sex (Seminario, 2022; Tadi et al., 2022).

Previous research also indicated significant positive correlations between first-generation students and increased levels of depression (Pease, 2015; Rajbhandari-Thapa et al., 2023). Smith and McLellan (2023) highlighted that, despite numerous challenges that students face regarding their mental health, first-generation students face additional challenges due to them being the first generation to enter tertiary education and thus being in an unknown environment. Furthermore, first-generation students are also less inclined to seek professional support to address their mental health concerns (Lipson et al., 2023).

With Anxiety as the dependent (criterion) variable and the second subscale of mental health, the results indicated that the combination of all nine independent variables accounted for 14.1% ($F_{9;1181} = 21.536$; $p \leq .001$) of the variance in the Anxiety scores of the sample. This finding is statistically significant on the 1% level, and the corresponding effect size ($f^2 = .16$) suggests that this finding is of medium practical significance. Therefore, the result practically indicates that 14.1% of the variance in the Anxiety score of university students can be explained by the combination of their media and technology usage, their attitudes towards media and technology, sex, and generational status. As mentioned above, to the researcher's knowledge, no previous studies are available that used the same combination of predictor variables as in the current study. However, a combination of previous research studies that used the same variables will be considered and discussed with Anxiety as the outcome variable.

With regards to media and technology usage and levels of anxiety among university students, previous studies found that media and technology usage is associated with increased levels of anxiety (Osisanwo et al., 2020; Wang et al., 2023; Wei, 2023). Lai (2023) reported that passive media and technology usage is also associated with increased levels of anxiety

among students (Prasad et al., 2023). Previous studies also found that university students who use media and technology excessively and who use more than one technological device also tend to experience higher levels of anxiety (Olola et al., 2022; Wei, 2023). Furthermore, Vultaggio (2021) reported that the current Generation Z students are the most anxious population due to this generation of students' active and consistent media and technology usage and engagement. Prasad et al. (2023) also reported that increased media and technology usage is associated with increased anxiety among students. However, they stated that the crucial factor for consideration relates to how media and technology are used rather than the frequency or duration of media and technology usage. Therefore, student's attitudes towards media and technology usage also play a crucial role when it comes to their levels of anxiety. Previous studies indicated that a preference for task switching is associated with increased anxiety among students (Prasad et al., 2023). On the contrary, a positive attitude towards media and technology usage is associated with decreased anxiety reported among students (Faulhaber et al., 2023; Osisanwo et al., 2020). Moreover, media and technology dependence (Vannucci et al., 2017) and a negative attitude towards media and technology (Vultaggio, 2021) have also been associated with increased levels of anxiety. Despite the previous studies attesting to the findings of the current study, it cannot go unnoticed that media and technology usage in effective manners and as a tool to provide mental health support to students can also contribute to decreased levels of anxiety among students (Sun, 2023).

Regarding biological sex and anxiety, previous studies reported that female university students tend to have significantly higher levels of anxiety compared to their male counterparts (Gao et al., 2020; Gestsdottir et al., 2021; Vuelvas-Olmos et al., 2022), especially relating to reported test anxiety amongst university students (Núñez-Peña et al., 2016). Possible reasons for the higher levels of anxiety among female students include that females are more likely to report symptoms and are more inclined to internal, emotional

coping where they might feel more easily overwhelmed and out of control (Bahrami & Yousefi, 2011; Gao et al., 2020; Vuelvas-Olmos et al., 2022). Contrary to these findings, Mandap (2016) attributed the higher levels of anxiety in male students to the fear they experience in seeking help or asking questions that relate to their academic performance. Lastly, concerning the generational status and levels of anxiety, it has been indicated that first-generation students report higher levels of anxiety compared to non-first-generation students (Potter et al., 2020). Possible reasons include but are not limited to financial pressure (Potter et al., 2020), acculturative stress and demands (Noel et al., 2021), as well as the absence of a sense of belonging and social support (Becerra, 2017).

5.4. Discussion on the Results of the Stepwise Regression Analyses

Since the hierarchical regression analyses did not deliver any practically significant findings for any of the individual independent variables, a decision was made to conduct stepwise regression analyses. The guidelines provided by Steyn (2005) were used to interpret the statistical results in terms of the effect sizes, which provides that proportional variance by the different independent variables should be interpreted as follows: $\rho^2 = .01$ (small); $\rho^2 = .10$ (medium) and $\rho^2 = .25$ (large) effect. The 1% and 5% significance levels were used, and the analyses were further performed for the three criterion variables independently, namely Depression, Anxiety, and Stress. From the stepwise regression analyses conducted, statistically and practically significant results were found, which will be discussed next.

5.4.1. Stepwise Regression Analysis with Depression as the Criterion Variable

In terms of Depression, the results of the stepwise regression analyses conducted indicated five predictor variables, namely Media Usage for Leisure, Preference for Task Switching, Positive Attitudes toward Media and Technology, Media and Technology Anxiety/Dependence, and Media Usage for Communication, that made a statistically significant contribution to the variance of Depression on the 1% level of significance. The

result indicated that these five predictor variables combined explained 12.2% of the variance of Depression. The finding was of medium practical significance (corresponding effect size of .14). Practically, this suggests that 12.2% of the depressive symptoms reported by the students can be explained by their media usage for leisure purposes, preferences for task switching, positive attitudes toward media and technology, media and technology anxiety/dependence, and media usage for communication. However, none of these five predictor variables individually indicated any practically significant findings. The predictor variable, Media Usage for Leisure, made the largest contribution to the variance of Depression (4.5%). This finding might imply that those university students who made more use of media and technology for leisure purposes have higher levels of depression. The remaining four predictor variables also contributed statistically significantly to the variance of Depression, namely Preference for Task Switching (1.8%), Positive Attitudes toward Media and Technology (2.6%), Media and Technology Anxiety/Dependence (2.9%), and Media Usage for Communication (.4%).

Therefore, in practical terms, the more students tend to use media and technology for leisure activities and purposes, the more likely they are to experience depressive symptoms, namely dysphoria, devaluation of life, lack of interest and/or involvement, inactivity, and/or self-depreciation (Lovibond & Lovibond, 1995; Syed et al., 2018; Yakasai et al., 2022). The general importance of leisure activities in daily functioning cannot be underestimated since leisure activities are vital for balanced and improved mental health (Avunduk, 2021; Li et al., 2019). However, studies indicated that media and technology usage for leisure purposes have replaced or lessened physical leisure activities to a great and concerning extent among students, which has been found to contribute to increased levels of depression (Bian & Xiang, 2023; Rutter et al., 2020). Avunduk (2021) has also raised the concern that the steady increase of media and technology usage for leisure purposes amongst university students is leading to

an increase in media and technology addiction, which has deleterious effects on students' levels of depression and general well-being. Due to the easily accessible and portable nature of media and technology, the time spent on media and technology for leisure purposes has become excessive, not only causing a disruption in daily activities and responsibilities but also leading to a constant and repetitive engagement on these devices and applications that have been found to increase reported depressive symptoms (Robinson & Smith, 2023). Furthermore, students engaging in video games and online gaming on technological devices for leisure purposes have also reported higher depressive symptoms and a general decrease in their well-being (Raouf et al., 2022). These findings have been attested to concerning social media browsing as a form of leisure activity that is associated with increased depression among university students (Sallehuddin et al., 2021). University students who tend to use media and technology as a form of leisure (Brailovskaia et al., 2020; Yan et al., 2022) and who report a preference for task switching (Xu et al., 2016) also reported higher levels of depression. Moreover, students who report media and technology anxiety/dependence (Haand & Shuwang, 2020) are more likely to experience depressive symptoms, while students who have positive attitudes toward media and technology (Brailovskaia et al., 2020) are less likely to experience depressive symptoms.

5.4.2. Stepwise Regression Analysis with Anxiety as the Criterion Variable

With regards to Anxiety as the criterion variable, the results of the stepwise regression analyses indicated five predictor variables, namely Media Usage for Leisure, Preference for Task Switching, Positive Attitudes towards Media and Technology, Media and Technology Anxiety/Dependence, and Media Usage for Communication, that made a statistically significant contribution to the variance of Anxiety on the 1% level of significance, and indicated that these five predictor variables combined explained 13.8% of the variance of Anxiety. This finding was of medium practical significance (corresponding effect size of .16).

Practically, this suggests that 13.8% of the Anxiety symptoms reported by the students can be explained by their usage of media and technology for leisure purposes, their preferences for task switching, their positive attitudes towards media and technology, their media and technology anxiety/dependence as well as their usage of media and technology for communication purposes. However, none of the five predictor variables individually indicated practically significant findings. The predictor variable, Media Usage for Leisure, made the largest contribution to the variance of Anxiety (4.2%). This finding implies that those university students who made more use of media and technology for leisure purposes have higher levels of anxiety. The remaining four predictor variables also contributed statistically significantly to the variance of Anxiety, namely, Preference for Task Switching (3.3%), Positive Attitudes towards Media and Technology (2.5%), Media and Technology Anxiety/Dependence (3.5%), and Media Usage for Communication (.3%). Therefore, in practical terms, the more students tend to use media and technology for leisure activities and purposes, the more likely they are to experience anxiety symptoms such as autonomic signs, situational anxiety, anxious affect subjectively experienced, and skeletal muscle effects experiences (Abiola et al., 2015; Lovibond & Lovibond, 1995; Yakasai et al., 2022). Similar yet different findings were found in a previous study by Anto et al. (2023), indicating that social media usage for leisure purposes among university students can either increase anxiety when students engage in upward social comparisons or use it as a form of leisure whilst procrastinating. However, it might decrease anxiety when students tend to use it as a form of leisure to connect virtually to get updates about information and friends and to use it as a form of brief escapism. The findings of this study are attested to in a previous study that indicated that excessive media and technology usage could have deleterious effects on students' mental health and has, therefore, been found to predict students' level of anxiety (Jiang, 2021). Similarly, it has been found that students tend to use every spare minute at their disposal to

use their technological devices and to browse media and applications for leisure purposes, which has been associated with higher anxiety reported among students (Kil et al., 2021). Regarding technology usage as part of video or other gaming activities for leisure, studies indicated that video gaming is associated with increased levels of anxiety among students (Alsaad et al., 2022; Yen et al., 2017). Furthermore, students who use media and technology for leisure purposes (Panova et al., 2019) and who reported a preference for task switching (Li & Fan, 2022) also reported higher levels of anxiety compared to their peers who engage in physical activities for leisure purposes and that tend to complete one task at hand instead of preferring task switching. Lastly, previous studies also attested to these findings, indicating that students reporting media and technology anxiety/dependence reported higher levels of anxiety (Brailovskaia et al., 2020), whilst those students who have positive attitudes towards media and technology reported lower levels of anxiety (Zhang et al., 2020).

5.4.3. Stepwise Regression Analysis with Stress as the Criterion Variable

Considering Stress, the results of the stepwise regression analyses revealed five predictor variables, namely Preference for Task Switching, Media Usage for Leisure, Media and Technology Anxiety/Dependence, Positive Attitudes towards Media and Technology, and Negative Attitudes toward Media and Technology, that made a statistically significant contribution (7.8%) to the variance of Stress on the 1% level of significance. The Positive Attitudes toward Media and Technology contributed the largest to the Stress variance (3.1%). This finding suggests that those students who tend to have more positive attitudes toward media and technology have lower levels of stress. In practical terms, students who have a positive view and attitude towards media and technology usage seem to have lower levels of stress symptoms, namely difficulty relaxing, nervous arousal, irritable or over-reactive mood, feeling impatient and being easily upset and/or agitated (Lovibond & Lovibond, 1995; Yakasai et al., 2022). Previous studies indicated that students' attitudes towards media and

technology usage play a vital role in how students perceive their levels of stress, indicating that students who tend to have a positive attitude towards the use of media and technology with the perspective that it is a useful tool that can be used to gain information and enhance growth on a personal and academic level, reported lower levels of stress (Eden et al., 2020; Kar et al., 2023). According to Lukenga et al. (2023), female students are more inclined to experience positive attitudes toward media and technology usage and to perceive the use thereof as an effective tool and mechanism that alleviates and decreases their academic stress. The remaining four predictor variables contributed statistically significantly to the variance of Stress: Preference for Task Switching (1.7%), Media Usage for Leisure (1.5%), Media and Technology Anxiety/Dependence (1%), and Negative Attitudes toward Media and Technology (.5%). However, none of the predictor variables, whether individually or in combination, were of any practical significance.

5.5. Limitations of the Study

Certain limitations should be considered in this study, especially when interpreting the results.

Some limitations should be noted regarding the data collection procedure and the measurement scales. All the measurement scales and documentation used during the initial data collection procedure were provided in English, which might have been a possible language barrier for some participants. Thus, the possibility exists that some questions and/or information might have been misunderstood and misinterpreted by some of the participants.

Another limitation of the study relates to the generalisability of the results due to the selected sample and the context in where the data was collected. The sample consisted of students from the University of the Free State who studied under the Faculty of Humanities, which can be regarded as a unique and contextualised environment. Therefore, the generalisation of the results is limited and cannot be generalised to the broader context

(Emerson, 2021), which includes contexts such as other university faculties and other tertiary institutions. Furthermore, the original study used convenience sampling. The current findings are representative of the distinct population of undergraduate university students who participated in the original study (Emerson, 2021; Farrokhi & Mahmoudi-Hamidabad, 2012). In the current study, the sample also consisted of predominantly female participants which might have a potential impact on the findings of the study. The findings can, therefore, not be generalised to other age groups of students or any other academic groups beyond the context of the sample in the current study. Moreover, this study used a quantitative research approach, which might provide a less detailed picture of the participant's thoughts, motivation, and relevant context and dynamics (Mander, 2022), which a qualitative research approach might better explain.

Another limitation relates to the reactivity of participants, which refers to the intentional modification of participants' behaviour or responses when they know that they are observed or studied, wherein they might intentionally provide distorted responses or answers during the completion of self-reporting measures (Elston, 2021). Therefore, despite being anonymous, the student participants might have provided false or less accurate responses when asked about their Media and Technology Usage, Attitudes towards Media, Depression, Anxiety, and Stress This could be because the participants are hesitant to admit to their possible levels or intensity of the variable(s) questioned.

Lastly, it should be noted that the identified variables were only measured over a short and limited period, thus, not considering the possible long-term changes and effects in due course, especially with the impact that the COVID-19 pandemic might have had afterwards.

5.6. Recommendations for Future Studies

Possible recommendations for future studies related to the variables considered during this research study will be provided, also considering the limitations discussed and described

above. Firstly, it is recommended that future studies provide the relevant and appropriate measurement scales and documentation to the participants, as far as reasonably possible, in more than one language (instead of only English) to eliminate or reduce the impact that language barriers and misunderstandings of questions might have on the data or information collected.

Media and technology usage has become a field of interest and concern due to its steady increase and inevitable nature in the daily functioning of university students, especially (Yadav & Reddy, 2023). However, there is limited South African research relating to the association between media and technology usage and students' mental health. Therefore, it is an area recommended for future study within the South African context. In order to address the limitation of generalisability, random sampling is recommended for future studies to address and account for a larger sample of the South African student population, increasing the generalisability to a broader context than only students at the University of the Free State. Due to the culture-rich nature of South Africa, random sampling might also yield more comprehensive and representative results with more accurate generalisability over the diverse student population. The subjective experience related to a singular tertiary institution and context is closely related hereto. Thus, it is recommended that future studies extend the research to other tertiary education institutions to obtain more accurate results from student populations from different contexts and institutions. Moreover, since this study only focused on undergraduate university students, extending future research to a broader sample of students, such as postgraduate students at different institutions, would be beneficial.

Furthermore, the recommended expansion of studies relating to the association between media and technology usage and mental health in university students would contribute to knowledge on both the advantages and disadvantages thereof, which can assist

in increasing awareness and developing preventative strategies relating to detrimental effects on mental health (Yadav & Reddy, 2023).

5.7. Conclusion

This chapter provided a discussion and elaboration on the results obtained from the current study. The focus was mainly on results that were statistically and practically significant. At the onset of this chapter, the statistically significant correlations between the relevant variables used in this study were discussed based on the results obtained by examining the Pearson Product Moment correlation coefficients. Thereafter, the focus was turned to the predictors of Mental Health by exploring the contribution of the independent variables, as a set and individually, to the proportion of variance in the dependent variables based on the results obtained from the hierarchical regression analyses conducted. Subsequently, since the hierarchical regression analyses did not deliver any practically significant findings for any of the individual independent variables, a decision was made to conduct stepwise regression analyses. These results were then discussed by exploring the independent variables in combination and their predictive value on Mental Health, more specifically, Depression, Anxiety, and Stress. This chapter also presented the limitations to be considered as well as the recommendations for future research endeavours. Despite the limitations of the study that were addressed and discussed above, the study is still deemed valuable in contributing to existing literature and knowledge on the relevant topic, especially in contributing to knowledge in the South African context. Since media and technology usage has seen exponential growth, especially among undergraduate university students, the impact thereof on the mental health of university students is an area of both interest and concern, which this study addressed. In considering the importance thereof and the possible detrimental effects, these results can be considered pivotal in increasing awareness and contributing to the development of preventative measures in the future.

REFERENCES

Abiola, T., Lawal, I., & Habib, Z. (2015). Psychological distress due to academic stress among clinical students in a Nigerian tertiary institution: Comparison between medical and physiotherapy students. *Nigerian Journal of Basic and Clinical Sciences, 12*(2), 81-85. https://doi.org/10.4103/0331-8540.169298

Abrams, Z. (2022, October 1). *Student mental health is in crisis. Campuses are rethinking their approach*. American Psychological Association. https://www.apa.org/monitor/2022/10/mental-health-campus-care

Abrar-ul-Hassan, S., & Safdar, G. (2022). Relationship between self-esteem and problematic use of Facebook among university students. *Annals of Social Sciences and Perspective*, *3*(1), 199–217. https://doi.org/10.52700/assap.v3i1.83

Adeyanju, G. C., Solfa, R. P., Tran, T. L., Wohlfarth, S., Büttner, J., Osobajo, O. A., & Otitoju, A. (2021). Behavioural symptoms of mental health disorder such as depression among young people using Instagram: A systematic review. *Translational Medicine Communications*, *6*(1), 1-13. https://doi.org/10.1186/s41231-021-00092-3

Afifi, M. (2007). Gender differences in mental health. *Singapore Medical Journal*, *48(5)*, 385–391. http://smj.sma.org.sg/4805/4805ra1.pdf

Afifi, T. D., Zamanzadeh, N., Harrison, K., & Acevedo Callejas, M. (2018). WIRED: The impact of media and technology use on stress (cortisol) and inflammation (interleukin IL-6) in fast paced families. *Computers in Human Behavior*, *81*, 265–273. https://doi.org/10.1016/j.chb.2017.12.010

Ahmad, N., Hussain, S., & Munir, N. (2018). Social networking and depression among university students. *Pakistan Journal of Medical Research*, *57*(2), 77–82. https://www.researchgate.net/publication/326112260_Social_Networking_and_Depression_among_University_Students

Aichner, T., Grünfelder, M., Maurer, O., & Jegeni, D. (2021). Twenty-five years of social media: A review of social media applications and definitions from 1994 to 2019. *Cyberpsychology, Behavior, and Social Networking*, *24*(4), 215–222. https://doi.org/10.1089/cyber.2020.0134

Akin, A., & Çetın, B. (2007). The Depression Anxiety and Stress Scale (DASS): The study of validity and reliability. *Educational Sciences: Theory & Practice, 7(1),* 260–268. https://www.proquest.com/openview/10866064bff9802700541ea8d2dd8f71/1?pq-origsite=gscholar&cbl=28575

Aldiabat, K., Matani, N., & Le Navenec, C.-L. (2014). Mental health among undergraduate university students: A background paper for administrators, educators and healthcare providers. *Universal Journal of Public Health*, *2*(8), 209–214. https://doi.org/10.13189/ujph.2014.020801

Ali, A. M., Alkhamees, A. A., Hori, H., Kim, Y., & Kunugi, H. (2021). The Depression Anxiety Stress Scale 21: Development and validation of the Depression Anxiety Stress Scale 8-item in psychiatric patients and the general public for easier mental health measurement in a post COVID-19 world. *International Journal of Environmental Research and Public Health*, *18*(19), 1-20. https://doi.org/10.3390/ijerph181910142

Allan, A. (2015). *Law and ethics in psychology: An international perspective* (3rd ed.). Inter-Ed.

Alonzo, R., Hussain, J., Stranges, S., & Anderson, K. K. (2021). Interplay between social media use, sleep quality, and mental health in youth: A systematic review. *Sleep Medicine Reviews, 56,* 1-12. https://doi.org/10.1016/j.smrv.2020.101414

Alotaibi, M. S., Fox, M., Coman, R., Ratan, Z. A., & Hosseinzadeh, H. (2022). Smartphone addiction prevalence and its association on academic performance, physical health,

and mental well-being among university students in Umm Al-Qura University (UQU), Saudi Arabia. *International Journal of Environmental Research and Public Health*, *19*(6), 1-17. https://doi.org/10.3390/ijerph19063710

Alsaad, F., Binkhamis, L., Alsalman, A., Alabdulqader, N., Alamer, M., Abualait, T., Khalil, M. S., & Ghamdi, K. S. A. (2022). Impact of action video gaming behavior on attention, anxiety, and sleep among university students. *Psychology Research and Behavior Management*, *15*(15), 151–160. https://doi.org/10.2147/PRBM.S347694

Alsunni, A. A., & Latif, R. (2020). Higher emotional investment in social media is related to anxiety and depression in university students. *Journal of Taibah University Medical Sciences*, *16*(2), 247-252. https://doi.org/10.1016/j.jtumed.2020.11.004

American College Health Association. (2022). *American College Health Association-National College Health Assessment III: Reference group executive summary fall 2021*. American College Health Association. https://www.acha.org/documents/ncha/NCHA-III_FALL_2021_REFERENCE_GROUP_EXECUTIVE_SUMMARY.pdf

American Institute of Stress. (2022). *What is stress?* The American Institute of Stress. https://www.stress.org/daily-life

American Psychiatric Association. (2022a). *Diagnostic and statistical manual of mental disorder* (5th ed., text rev.). Author.

American Psychiatric Association. (2022b, November). *What is mental illness?* American Psychiatric Association. https://www.psychiatry.org/patients-families/what-is-mental-illness

Anto, A., Asif, R. O., Basu, A., Kanapathipillai, D., Salam, H., Selim, R., Zaman, J., & Eisingerich, A. B. (2023). Exploring the impact of social media on anxiety among

university students in the United Kingdom: Qualitative study. *JMIR Publications*, *7*, 1-17. https://doi.org/10.2196/43037

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*(5), 469–480. https://doi.org/10.1037/0003-066x.55.5.469

Arnett, J. J. (2015). College students as emerging adults. *Emerging Adulthood*, *4*(3), 219–222. https://doi.org/10.1177/2167696815587422

Arnett, J. J., Žukauskienė, R., & Sugimura, K. (2014). The new life stage of emerging adulthood at ages 18–29 years: Implications for mental health. *The Lancet Psychiatry*, *1*(7), 569–576. https://doi.org/10.1016/s2215-0366(14)00080-7

Arslan, G., Yıldırım, M., & Zangeneh, M. (2021). Coronavirus anxiety and psychological adjustment in college students: Exploring the role of college belongingness and social media addiction. *International Journal of Mental Health and Addiction*, *20*, 1546–1559. https://doi.org/10.1007/s11469-020-00460-4

Asad, M. M., Erum, D., Churi, P., & Moreno Guerrero, A. J. (2023). Effect of technostress on psychological well-being of post-graduate students: A perspective and correlational study of higher education management. *International Journal of Information Management Data Insights*, *3*(1), 100149. https://doi.org/10.1016/j.jjimei.2022.100149

Auerbach, R. P., Alonso, J., Axinn, W. G., Cuijpers, P., Ebert, D. D., Green, J. G., Hwang, I., Kessler, R. C., Liu, H., Mortier, P., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Aguilar-Gaxiola, S., Al-Hamzawi, A., Andrade, L. H., Benjet, C., Caldas-de-Almeida, J. M., Demyttenaere, K., & Florescu, S. (2016). Mental disorders among college students in the World Health Organization World Mental Health Surveys.

Psychological Medicine, *46*(14), 2955–2970. https://doi.org/10.1017/s0033291716001665

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., & Kessler, R. C. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, *127*(7), 623–638. https://doi.org/10.1037/abn0000362

Avunduk, Y. (2021). The relationship between leisure satisfaction and social media addictions of individuals at university. *Journal of Educational Issues, 7*(1), 507-522. https://doi.org/10.5296/jei.v7i1.18592

Bahrami, F., & Yousefi, N. (2011). Females are more anxious than males: A metacognitive perspective. *Iranian Journal of Psychiatry and Behavioral Sciences*, *5*(2), 83–90. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3939970/#:~:text=Conclusion%3A%20Metacognitive%20beliefs%20in%20uncontrollability

Balgiu, B. A. (2017). Self-esteem, personality and resilience. Study of a students emerging adults group. *Journal of Educational Sciences and Psychology*, *7(1)*, 93–99. https://www.researchgate.net/publication/318379139_Self-esteem_personality_and_resilience_Study_of_a_students_emerging_adults_group

Bantjes, J., Kessler, M., Lochner, C., Breet, E., Bawa, A., Roos, J., Davids, C., Muturiki, M., Kessler, R. C., & Stein, D. J. (2023). The mental health of university students in South Africa: Results of the national student survey. *Journal of Affective Disorders*, *321*, 217–226. https://doi.org/10.1016/j.jad.2022.10.044

Bantjes, J., Lochner, C., Saal, W., Roos, J., Taljaard, L., Page, D., Auerbach, R. P., Mortier, P., Bruffaerts, R., Kessler, R. C., & Stein, D. J. (2019). Prevalence and

sociodemographic correlates of common mental disorders among first-year university students in post-apartheid South Africa: Implications for a public mental health approach to student wellness. *BMC Public Health*, *19*(1), 1–12. https://doi.org/10.1186/s12889-019-7218-y

Bantjes, J., Saal, W., Gericke, F., Lochner, C., Roos, J., Auerbach, R. P., Mortier, P., Bruffaerts, R., Kessler, R. C., & Stein, D. (2020). Mental health and academic failure among first-year university students in South Africa. *South African Journal of Psychology*, *51*(3), 2–13. https://doi.org/10.1177/0081246320963204

Bantjes, J., Saal, W., Lochner, C., Roos, J., Auerbach, R. P., Mortier, P., Bruffaerts, R., Kessler, R. C., & Stein, D. J. (2020). Inequality and mental healthcare utilisation among first-year university students in South Africa. *International Journal of Mental Health Systems*, *14*(1), 1-11. https://doi.org/10.1186/s13033-020-0339-y

Barton, A. L., & Hirsch, J. K. (2015). Permissive parenting and mental health in college students: Mediating effects of academic entitlement. *Journal of American College Health*, *64*(1), 1–8. https://doi.org/10.1080/07448481.2015.1060597

Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology*, *43*(8), 667–672. https://doi.org/10.1007/s00127-008-0345-x

Becerra, M. (2017). *Mental health and academic performance of first-generation college students and continuing-generation college students.* Escholarship.org. https://escholarship.org/uc/item/4691k02z

Becker, M. W., Alzahabi, R., & Hopwood, C. J. (2013). Media multitasking is associated with symptoms of depression and social anxiety. *Cyberpsychology, Behavior, and Social Networking*, *16*(2), 132–135. https://doi.org/10.1089/cyber.2012.0291

Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *Journal of Affective Disorders*, *173*(1), 90–96. https://doi.org/10.1016/j.jad.2014.10.054

Berryman, C., Ferguson, C. J., & Negy, C. (2018). Social media use and mental health among young adults. *Psychiatric Quarterly*, *89*(2), 307–314. https://doi.org/10.1007/s11126-017-9535-6

Bettmann, J. E., Anstadt, G., Casselman, B., & Ganesh, K. (2020). Young adult depression and anxiety linked to social media use: Assessment and treatment. *Clinical Social Work Journal*, *49*, 368-379. https://doi.org/10.1007/s10615-020-00752-1

Bian, J., & Xiang, Z. (2023). Do the various leisure forms have equal effects on mental health? A longitudinal analysis of self-selected leisure activities. *Frontiers in Public Health*, *11*, 1-11. https://doi.org/10.3389/fpubh.2023.1134854

Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, *8*(1), 39–51. https://doi.org/10.1089/cpb.2005.8.39

Bickham, D. S., Hswen, Y., & Rich, M. (2015). Media use and depression: Exposure, household rules, and symptoms among young adolescents in the USA. *International Journal of Public Health*, *60*(2), 147–155. https://doi.org/10.1007/s00038-014-0647-6

Birech, J. K. (2023). Gender differences in stress and mental health among students in higher education institutions. *IGI Global*, 1–18. https://doi.org/10.4018/979-8-3693-0708-3.ch001

Bolatov, A. K., Seisembekov, T. Z., Askarova, A. Z., Baikanova, R. K., Smailova, D. S., & Fabbro, E. (2020). Online-learning due to COVID-19 improved mental health among

medical students. *Medical Science Educator*, *31*(1), 183–192. https://doi.org/10.1007/s40670-020-01165-y

Bostic, J. (2013). The first-generation student experience: Implications for campus practice, and strategies for improving persistence and success. *Teaching Theology & Religion*, *16*(1), 51–52. https://doi.org/10.1111/teth.12092

Bowe, K. (2022, July 19). *College students and depression*. Mayo Clinic Health System. https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/college-students-and-depression

Boyd, D. M., & Ellison, N. B. (2008). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 210–230. https://doi.org/10.1111/j.1083-6101.2007.00393.x

Braghieri, L., Levy, R., & Makarin, A. (2021). Social Media and Mental Health. *SSRN Electronic Journal*, *112*(11), 1-94. https://doi.org/10.2139/ssrn.3919760

Brailovskaia, J., Margraf, J., Ceccatelli, S., & Cosci, F. (2023). The relationship among psychological distress, well-being and excessive social media use during the outbreak of Covid-19: A longitudinal investigation. *Clinical Psychology & Psychotherapy*, *30*(5), 1013-1019. https://doi.org/10.1002/cpp.2853

Brailovskaia, J., Schillack, H., & Margraf, J. (2020). Tell me why are you using social media (SM)! Relationship between reasons for use of SM, SM flow, daily stress, depression, anxiety, and addictive SM use: An exploratory investigation of young adults in Germany. *Computers in Human Behavior*, *113*, 1-9. https://doi.org/10.1016/j.chb.2020.106511

Breines, M. R., Madge, C., & Dalu, M. T. B. (2020). Social media among African students: Recentring typologies of non-use. *Digital Geography and Society*, *1*, 1-9. https://doi.org/10.1016/j.diggeo.2020.100006

Brooks, S., & Longstreet, P. (2015). Social networking's peril: Cognitive absorption, social networking usage, and depression. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *9*(4), 1-19. https://doi.org/10.5817/cp2015-4-5

Brown, P. (2016). *The invisible problem?: Improving students' mental health*. Higher Education Policy Institute.

Bucci, S., Schwannauer, M., & Berry, N. (2019). The digital revolution and its impact on mental health care. *Psychology and Psychotherapy*, *92*(2), 277–297. https://doi.org/10.1111/papt.12222

Buckworth, J., & Nigg, C. (2004). Physical activity, exercise, and sedentary behavior in college students. *Journal of American College Health*, *53*(1), 28–34. https://doi.org/10.3200/jach.53.1.28-34

Bui, C. (2023). *Examining academic challenges and mental health among first-generation and non-first-generation students* [Honours thesis, University of Central Florida]. Stars Library.

Burger, K., & Rocha, D. S. (2023). Mental health, gender, and higher education attainment. *Zeitschrift Fur Erziehungswissenschaft*, 1-34. https://doi.org/10.1007/s11618-023-01187-3

Çağan, Ö., Ünsal, A., & Çelik, N. (2014). Evaluation of college students': The level of addiction to cellular phone and investigation on the relationsship between the addiction and the level of depression. *Procedia - Social and Behavioral Sciences*, *114*, 831–839. https://doi.org/10.1016/j.sbspro.2013.12.793

Campbell, F., Blank, L., Cantrell, A., Baxter, S., Blackmore, C., Dixon, J., & Goyder, E. (2022). Factors that influence mental health of university and college students in the UK: A systematic review. *BMC Public Health*, *22*(1), 1-22. 10.1186/s12889-022-13943-x

Casale, S., & Fioravanti, G. (2015). Satisfying needs through social networking sites: A pathway towards problematic internet use for socially anxious people? *Addictive Behaviors Reports*, *1*, 34–39. https://doi.org/10.1016/j.abrep.2015.03.008

Ceyhan, A., Ceyhan, E., & Kurtyılmaz, Y. (2009). Investigation of university students' depression. *Egitim Arastirmalari-Eurasian Journal of Educational Research*, *36*(1), 75–90.

Chakraborty, P., Mittal, P., Gupta, M. S., Yadav, S., & Arora, A. (2020). Opinion of students on online education during the COVID-19 pandemic. *Human Behavior and Emerging Technologies*, *3*(3), 347-459. https://doi.org/10.1002/hbe2.240

Chang, J., Wang, S., Mancini, C., McGrath-Mahrer, B., & Orama de Jesus, S. (2019). The complexity of cultural mismatch in higher education: Norms affecting first-generation college students' coping and help-seeking behaviors. *Cultural Diversity and Ethnic Minority Psychology*, *26*(3), 280-294. https://doi.org/10.1037/cdp0000311

Chang, J.-J., Ji, Y., Li, Y.-H., Pan, H.-F., & Su, P.-Y. (2021). Prevalence of anxiety symptom and depressive symptom among college students during COVID-19 pandemic: A meta-analysis. *Journal of Affective Disorders*, *292*, 242–254. https://doi.org/10.1016/j.jad.2021.05.109

Charles, S. (2019, March 14). *Social media linked to rise in mental health disorders in teens, survey finds*. NBC News. https://www.nbcnews.com/health/mental-health/social-media-linked-rise-mental-health-disorders-teens-survey-finds-n982526

Chen, I.-H., Pakpour, A. H., Leung, H., Potenza, M. N., Su, J.-A., Lin, C.-Y., & Griffiths, M. D. (2020). Comparing generalized and specific problematic smartphone/internet use: Longitudinal relationships between smartphone application-based addiction and social media addiction and psychological distress. *Journal of Behavioral Addictions*, *9*(2), 410–419. https://doi.org/10.1556/2006.2020.00023

Chen, S. K. (2012). Internet use and psychological well-being among college students: A latent profile approach. *Computers in Human Behavior*, *28*(6), 2219–2226. https://doi.org/10.1016/j.chb.2012.06.029

Christiansen, D. M. (2015). *Examining sex and gender differences in anxiety disorders. A Fresh Look at Anxiety Disorders* (1st ed.). Intech-Open.

Chukwuere, J. E., & Chukwuere, P. C. (2017). The impact of social media on social lifestyle: A case study of university female students. *Gender & Behaviour*, *15*(4), 9967–9981.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Collins, L. M. (2007). Research design and methods. *Encyclopedia of Gerontology*, *2*, 433–442. https://doi.org/10.1016/b0-12-370870-2/00162-1

Costa, J. J. M., Matos, A. P., Rosario, M. D. P., Ceu Salvador, M. D., Luz Vale-Dias, M. D., & Zenha-Rela, M. (2016). *Evaluating use and attitudes towards social media and ICT for Portuguese youth: The MTUAS-PY scale*. (1st ed.). Future Academy.

Cotten, S. R. (2008). Students' technology use and the impacts on well-being. *New Directions for Student Services*, *2008*(124), 55–70. https://doi.org/10.1002/ss.295

Cotten, S. R., Ford, G., Ford, S., & Hale, T. M. (2012). Internet use and depression among older adults. *Computers in Human Behavior*, *28*(2), 496–499. https://doi.org/10.1016/j.chb.2011.10.021

Coyne, S. M., Rogers, A. A., Zurcher, J. D., Stockdale, L., & Booth, M. (2020). Does time spent using social media impact mental health?: An eight year longitudinal study. *Computers in Human Behavior*, *104*(1), 1–9. https://doi.org/10.1016/j.chb.2019.106160

Coyne, S. M., Stockdale, L., & Summers, K. (2019). Problematic cell phone use, depression, anxiety, and self-regulation: Evidence from a three year longitudinal study from

adolescence to emerging adulthood. *Computers in Human Behavior*, *96*, 78–84. https://doi.org/10.1016/j.chb.2019.02.014

Cronje, J. (2019). *Predictors of emotional intelligence amongst university students* [Master's thesis, University of the Free State]. Kovsie Scholar.

Croock, J., Mpinganjira, M. G., Gathoo, K., Bulmer, R., Lautenberg, S., Dlamini, Q., Londani, P., Solontsi, A., Stevens, C., & Francis, J. M. (2023). Probable depression and its correlates among undergraduate students in Johannesburg, South Africa. *Frontiers in Psychiatry*, *14*, 1-8. https://doi.org/10.3389/fpsyt.2023.1018197

Damanik, E. D. (2011). *The measurement of reliability, validity, items analysis and normative data of Depression Anxiety Stress Scale.* http://www2.psy.unsw.edu.au/groups/DASS/Indonesian/Damanik%20Indonesian%20translation%20-%20Reliability

Damyanov, M. (2023, March 13). *Guide to ethical considerations in research: Overview and examples.* https://dovetail.com/research/ethical-considerations-in-research/

Daniali, H., Martinussen, M., & Flaten, M. A. (2023). A global meta-analysis of depression, anxiety, and stress before and during COVID-19. *Health Psychology*, *42*(2), 124–138. https://doi.org/10.1037/hea0001259

DataReportal. (2023). *Digital around the world*. DataReportal – Global Digital Insights. https://datareportal.com/global-digital-overview

Davey, G. (2016, December 15). *Social media, loneliness, and anxiety in young people.* Psychology Today South Africa. https://www.psychologytoday.com/za/blog/why-we-worry/201612/social-media-loneliness-and-anxiety-in-young-people

Davies, E. B., Wardlaw, J., Morriss, R., & Glazebrook, C. (2016). An experimental study exploring the impact of vignette gender on the quality of university students' mental

health first aid for peers with symptoms of depression. *BMC Public Health*, *16*(1), 187-198. https://doi.org/10.1186/s12889-016-2887-2

De Doncker, K., & McLean, N. (2022). Social media, sleep difficulties and depressive symptoms: A case study of South African youth in Cape Town. *Technology in Society*, *70*, 102038. https://doi.org/10.1016/j.techsoc.2022.102038

De Paula, W., Breguez, G. S., Machado, E. L., & Meireles, A. L. (2020). Prevalence of anxiety, depression, and suicidal ideation symptoms among university students: A systematic review. *Brazilian Journal of Health Review*, *3*(4), 8739–8756. https://doi.org/10.34119/bjhrv3n4-119

De', R., Pandey, N., & Pal, A. (2020). Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice. *International Journal of Information Management*, *55*(102171), 1-5. https://doi.org/10.1016/j.ijinfomgt.2020.102171

Deb, A. (2015). Phantom vibration and phantom ringing among mobile phone users: A systematic review of literature. *Asia-Pacific Psychiatry*, *7*(3), 231–239. https://doi.org/10.1111/appy.12164

Deng, J., Zhou, F., Hou, W., Silver, Z., Wong, C. Y., Chang, O., Drakos, A., Zuo, Q. K., & Huang, E. (2021). The prevalence of depressive symptoms, anxiety symptoms and sleep disturbance in higher education students during the COVID-19 pandemic: A systematic review and meta-analysis. *Psychiatry Research*, *301*, 1-20. https://doi.org/10.1016/j.psychres.2021.113863

Dessauvagie, A. S., Dang, H.-M., Nguyen, T. A. T., & Groen, G. (2021). Mental health of university students in Southeastern Asia: A systematic review. *Asia Pacific Journal of Public Health*, *34*(2-3), 172-181. https://doi.org/10.1177/10105395211055545

Dobrean, A., & Pasarelu, C. R. (2016). *Impact of social media on social anxiety: A systematic review. New Developments in Anxiety Disorders* (1st ed.). Intech-Open.

Donzuso, G., Cerasa, A., Gioia, M. C., Caracciolo, M., & Quattrone, A. (2014). The neuroanatomical correlates of anxiety in a healthy population: Differences between the State-Trait Anxiety Inventory and the Hamilton Anxiety Rating Scale. *Brain and Behavior*, *4*(4), 504–514. https://doi.org/10.1002/brb3.232

Dragioti, E., Li, H., Tsitsas, G., Lee, K. H., Choi, J., Kim, J., Choi, Y. J., Tsamakis, K., Estradé, A., Agorastos, A., Vancampfort, D., Tsiptsios, D., Thompson, T., Mosina, A., Vakadaris, G., Fusar-Poli, P., Carvalho, A. F., Correll, C. U., Han, Y. J., & Park, S. (2022). A large-scale meta-analytic atlas of mental health problems prevalence during the COVID-19 early pandemic. *Journal of Medical Virology*, *94*(5), 1935–1949. https://doi.org/10.1002/jmv.27549

Eden, A. L., Johnson, B. K., Reinecke, L., & Grady, S. M. (2020). Media for coping during COVID-19 social distancing: Stress, anxiety, and psychological well-being. *Frontiers in Psychology*, *11*, 1-21. https://doi.org/10.3389/fpsyg.2020.577639

El Kahi, H. A., Abi Rizk, G. Y., Hlais, S. A., & Adib, S. M. (2012). Health-care-seeking behaviour among university students in Lebanon. *Eastern Mediterranean Health Journal*, *18*(6), 598–606. https://doi.org/10.26719/2012.18.6.598

Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of Affective Disorders*, *207*, 251–259. https://doi.org/10.1016/j.jad.2016.08.030

Elhai, J. D., Levine, J. C., Dvorak, R. D., & Hall, B. J. (2016). Fear of missing out, need for touch, anxiety and depression are related to problematic smartphone use. *Computers in Human Behavior*, *63*, 509–516. https://doi.org/10.1016/j.chb.2016.05.079

Eloff, I., & Graham, M. (2020). Measuring mental health and well-being of South African undergraduate students. *Global Mental Health*, *7*, 34-44. https://doi.org/10.1017/gmh.2020.26

Elston, D. M. (2021). The Hawthorne effect. *Journal of the American Academy of Dermatology*, 1-2. https://doi.org/10.1016/j.jaad.2021.01.085

Emerson, R. W. (2021). Convenience sampling revisited: Embracing its limitations through thoughtful study design. *Journal of Visual Impairment & Blindness*, *115*(1), 76–77. https://doi.org/10.1177/0145482x20987707

Emm, D. (2021, September). *Our changing relationship with social media: A global study* [Conference session]. Kaspersky Convention, London, United Kingdom. https://media.kasperskydaily.com/wp-content/uploads/sites/92/2021/09/09104441/Kaspersky_Our_Changing_Relationship_with_Social_Media-_A_Global_Study.pdf

Esmaeilimotlagh, M., Oveisi, K., Alizadeh, F., Kheirabadi, M., Esmaeilimotlagh, M., Oveisi, K., Alizadeh, F., & Kheirabadi, M. (2018). An Investigation on Coping Skills Training Effects on Mental Health Status of University Students. *Journal of Humanities Insights*, *2*(1), 37–42. https://doi.org/10.22034/jhi.2018.61430

Ezoe, S., Iida, T., Inoue, K., & Toda, M. (2019). Smartphone addiction and sleep quality associated with depression in university students in Japan. *International Journal of Cyber Behavior, Psychology and Learning*, *9*(4), 22–31. https://doi.org/10.4018/ijcbpl.2019100102

Farrokhi, F., & Mahmoudi-Hamidabad, A. (2012). Rethinking convenience sampling: Defining quality criteria. *Theory and Practice in Language Studies*, *2*(4), 784-792. https://doi.org/10.4304/tpls.2.4.784-792

Faulhaber, M. E., Lee, J. E., & Gentile, D. A. (2023). The effect of self-monitoring limited social media use on psychological well-being. *Technology, Mind, and Behavior*, *4*(2), 1-23. https://doi.org/10.1037/tmb0000111

Foulkes, L., & Andrews, J. L. (2023). Are mental health awareness efforts contributing to the rise in reported mental health problems? A call to test the prevalence inflation hypothesis. *New Ideas in Psychology*, *69*, 1-6. https://doi.org/10.1016/j.newideapsych.2023.101010

Fuady, I., Sutarjo, M. A. S., & Ernawati, E. (2021). Analysis of students' perceptions of online learning media during the Covid-19 pandemic (Study of e-learning media: Zoom, Google Meet, Google Classroom, and LMS). *Randwick International of Social Science Journal*, *2*(1), 51–56. https://doi.org/10.47175/rissj.v2i1.177

Fulk, G. (2023). Descriptive statistics: An important first step. *Journal of Neurologic Physical Therapy*, *47*(2), 63–63. https://doi.org/10.1097/npt.0000000000000434

Fusco, J. (2017). How gender differences affect mental health outcomes. *Perspectives*, *9*(6), 1-11. https://scholars.unh.edu/perspectives/vol9/iss1/6

Galderisi, S., Heinz, A., Kastrup, M., Beezhold, J., & Sartorius, N. (2015). Toward a new definition of mental health. *World Psychiatry*, *14*(2), 231–233. https://doi.org/10.1002/wps.20231

Gao, W., Ping, S., & Liu, X. (2020). Gender differences in depression, anxiety, and stress among college students: A longitudinal study from China. *Journal of Affective Disorders*, *263*, 292–300. https://doi.org/10.1016/j.jad.2019.11.121

Garfin, D. R. (2020). Technology as a coping tool during the COVID-19 pandemic: Implications and recommendations. *Stress and Health*, *36*(4), 555-559. https://doi.org/10.1002/smi.2975

Garriott, P. O., & Nisle, S. (2018). Stress, coping, and perceived academic goal progress in first-generation college students: The role of institutional supports. *Journal of Diversity in Higher Education*, *11*(4), 436–450. https://doi.org/10.1037/dhe0000068

Gestsdottir, S., Gisladottir, T., Stefansdottir, R., Johannsson, E., Jakobsdottir, G., & Rognvaldsdottir, V. (2021). Health and well-being of university students before and during COVID-19 pandemic: A gender comparison. *PLOS ONE*, *16*(12), e0261346. https://doi.org/10.1371/journal.pone.0261346

Gibson, P. A., Baker, E. H., & Milner, A. N. (2016). The role of sex, gender, and education on depressive symptoms among young adults in the United States. *Journal of Affective Disorders*, *189*, 306–313. https://doi.org/10.1016/j.jad.2015.08.067

Gillen-O'Neel, C. (2019). Sense of belonging and student engagement: A daily study of first- and continuing-generation college students. *Research in Higher Education*, *62*, 45-71. https://doi.org/10.1007/s11162-019-09570-y

Goldstuck, A. (2016). *South African social media landscape 2016: Executive summary*. World Wide Worx. http://www.worldwideworx.com/wp-content/uploads/2016/02/SA-Social-Media-Landscape-2016-Executive-summary.pdf

Grant, K., Marsh, P., Syniar, G., Williams, M., Addlesperger, E., Kinzler, M. H., & Cowman, S. (2002). Gender differences in rates of depression among undergraduates: Measurement matters. *Journal of Adolescence*, *25*(6), 613–617. https://doi.org/10.1006/jado.2002.0508

Green, T., Wilhelmsen, T., Wilmots, E., Dodd, B., & Quinn, S. (2016). Social anxiety, attributes of online communication and self-disclosure across private and public Facebook communication. *Computers in Human Behavior*, *58*, 206–213. https://doi.org/10.1016/j.chb.2015.12.066

Greenleaf Walker, J. (2022, April 11). *Towards improving the mental health of students at South African universities*. Universities South Africa. https://www.usaf.ac.za/towards-improving-the-mental-health-of-students-at-south-african-universities/

Grieve, R., Indian, M., Witteveen, K., Anne Tolan, G., & Marrington, J. (2013). Face-to-face or Facebook: Can social connectedness be derived online? *Computers in Human Behavior*, *29*(3), 604–609. https://doi.org/10.1016/j.chb.2012.11.017

Gustafsson, E., Dellve, L., Edlund, M., & Hagberg, M. (2003). The use of information technology among young adults: Experience, attitudes and health beliefs. *Applied Ergonomics*, *34*(6), 565–570. https://doi.org/10.1016/s0003-6870(03)00082-6

Haand, R., & Shuwang, Z. (2020). The relationship between social media addiction and depression: A quantitative study among university students in Khost, Afghanistan. *International Journal of Adolescence and Youth*, *25*(1), 780–786. https://doi.org/10.1080/02673843.2020.1741407

Hampton, K. N., Shin, I., & Lu, W. (2016). Social media and political discussion: When online presence silences offline conversation. *Information, Communication & Society*, *20*(7), 1090–1107. https://doi.org/10.1080/1369118x.2016.1218526

Hanna, F., You, E., & Elsherif, M. (2023). Editorial: The impact of sedentary behavior and virtual lifestyle on physical and mental wellbeing: Social distancing from healthy living. *Frontiers in Public Health*, *11*, 1-3. https://doi.org/10.3389/fpubh.2023.1265814

Hawes, T., Zimmer-Gembeck, M. J., & Campbell, S. M. (2020). Unique associations of social media use and online appearance preoccupation with depression, anxiety, and appearance rejection sensitivity. *Body Image*, *33*(33), 66–76. https://doi.org/10.1016/j.bodyim.2020.02.010

Hayes, A. (2019). *Stepwise regression*. Investopedia. https://www.investopedia.com/terms/s/stepwise-regression.asp

Henderson, G. (2020). *How much time does the average person spend on social media?* https://www.digitalmarketing.org/blog/how-much-time-does-the-average-person-spend-on-social-media#:~:text=People%20aged

Hillyer, M. (2020, November 18). *Here's how technology has changed the world since 2000*. World Economic Forum. https://www.weforum.org/agenda/2020/11/heres-how-technology-has-changed-and-changed-us-over-the-past-20-years/

Hjorth, C. F., Bilgrav, L., Frandsen, L. S., Overgaard, C., Torp-Pedersen, C., Nielsen, B., & Bøggild, H. (2016). Mental health and school dropout across educational levels and genders: A 4.8-year follow-up study. *BMC Public Health*, *16*(1), 976-988. https://doi.org/10.1186/s12889-016-3622-8

Homick, C. R. (2023). *The mental health outcomes of first-generation collegiate clients compared to their non-first-generation peers* [Doctoral thesis, West Virginia University].WVU Libraries.

House, L. A., Neal, C., & Kolb, J. (2019). Supporting the mental health needs of first generation college students. *Journal of College Student Psychotherapy*, *34*(2), 1–11. https://doi.org/10.1080/87568225.2019.1578940

Howell, D. C. (2017). *Fundamental statistics for behavioral sciences* (9th ed.). Cengage.

Hubbard, K., Reohr, P., Tolcher, L., & Downs, A. (2018). Stress, mental health symptoms, and help-seeking in college students. *Psi Chi Journal of Psychological Research*, *23*(4), 293–305. https://doi.org/10.24839/2325-7342.jn23.4.293

Hull, M. (2022, May 26). *Anxiety disorders facts and statistics*. The Recovery Village. https://www.therecoveryvillage.com/mental-health/anxiety/anxiety-disorder-statistics/

Hummel, M. (2022). *Problematic social media use and depression in college students: A mediation study* [Master's thesis, Eastern Illinois University]. Booth Library.

Hwnag, H. S. (2019). Why social comparison on Instagram matters: Its impact on depression. *KSII Transactions on Internet and Information Systems*, *13*(3), 1626-1638. https://doi.org/10.3837/tiis.2019.03.029

IBM Corporation. (2023). *IBM SPSS Statistics for Windows* (Version 25). Armonk, NY: IBM Corp.

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research*, *47*(3), 391–400. https://doi.org/10.1016/j.jpsychires.2012.11.015

Inman, M. (2017). *Behind the stigma: The impact of gender and college adjustment on attitudes towards mental health disorders* [Honours thesis, University of Dayton]. Psychology Commons.

Islam, M. S., Sujan, M. S. H., Tasnim, R., Mohona, R. A., Ferdous, M. Z., Kamruzzaman, S., Toma, T. Y., Sakib, M. N., Pinky, K. N., Islam, M. R., Siddique, M. A. B., Anter, F. S., Hossain, A., Hossen, I., Sikder, M. T., & Pontes, H. M. (2021). Problematic smartphone and social media use among Bangladeshi college and university students amid COVID-19: The role of psychological well-being and pandemic related factors. *Frontiers in Psychiatry*, *12*, 1-12. https://doi.org/10.3389/fpsyt.2021.647386

Jelenchick, L. A., Eickhoff, J. C., & Moreno, M. A. (2013). "Facebook depression?" Social networking site use and depression in older adolescents. *Journal of Adolescent Health*, *52*(1), 128–130. https://doi.org/10.1016/j.jadohealth.2012.05.008

Jenkins, S. R., Belanger, A., Connally, M. L., Boals, A., & Durón, K. M. (2013). First-generation undergraduate students' social support, depression, and life satisfaction.

Journal of College Counseling, *16*(2), 129–142. https://doi.org/10.1002/j.2161-1882.2013.00032.x

Jeri-Yabar, A., Sanchez-Carbonel, A., Tito, K., Ramirez-del Castillo, J., Torres-Alcantara, A., Denegri, D., & Carreazo, Y. (2018). Association between social media use (Twitter, Instagram, Facebook) and depressive symptoms: Are Twitter users at higher risk? *International Journal of Social Psychiatry*, *65*(1), 14–19. https://doi.org/10.1177/0020764018814270

Jiang, S., & Ngien, A. (2020). The effects of Instagram use, social comparison, and self-esteem on social anxiety: A survey study in Singapore. *Social Media & Society*, *6*(2), 205630512091248. https://doi.org/10.1177/2056305120912488

Jiang, Y. (2021). Problematic social media usage and anxiety among university students during the COVID-19 pandemic: The mediating role of psychological capital and the moderating role of academic burnout. *Frontiers in Psychology*, *12*, 1-12. https://doi.org/10.3389/fpsyg.2021.612007

Johnston, M. P. (2014). Secondary data analysis: A method of which the time has come. *Qualitative and Quantitative Methods in Libraries*, *3*(3), 619–626. https://www.qqml-journal.net/index.php/qqml/article/view/169/170

Jones, L., & Vigo, D. (2023). Mental health and substance abuse. In: Raviglione, M.C.B., Tediosi, F., Villa, S., Casamitjana, N., Plasència, A. (Eds.), *Global Health Essentials. Sustainable Development Goals Series* (pp. 197–201). Springer Link. https://doi.org/10.1007/978-3-031-33851-9_29

Kahane, L. (2008). *Regression basics* (2nd ed.). Sage.

Kalinin, V. V., Hocaoglu, C., & Mohamed, S. (2021). *Anxiety disorders - The new achievements* (1st ed.). IntechOpen.

Kar, P., Tripathi, N., Tyagi, S., & Sharma, Y. (2023). Impact of social media on the stress level of college students. *International Journal of Educational Sciences and Research*, *13*(2), 31–44. https://www.researchgate.net/publication/376270919_IMPACT_OF_SOCIAL_MEDIA_ON_THE_STRESS_LEVEL_OF_COLLEGE_STUDENTS

Katikalapudi, R., Chellappan, S., Montgomery, F., Wunsch, D., & Lutzen, K. (2012). Associating internet usage with depressive behavior among college students. *IEEE Technology and Society Magazine*, *31*(4), 73–80. https://doi.org/10.1109/mts.2012.2225462

Kaya, F., Bostanci Daştan, N., & Durar, E. (2020). Smart phone usage, sleep quality and depression in university students. *International Journal of Social Psychiatry*, *67*(5), 002076402096020. https://doi.org/10.1177/0020764020960207

Kazdin, A. E. (2019). Annual research review: Expanding mental health services through novel models of intervention delivery. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *60*(4), 455–472. https://doi.org/10.1111/jcpp.12937

Kemp, S. (2023, February 13). *Digital 2023: South Africa*. DataReportal – Global Digital Insights. https://datareportal.com/reports/digital-2023-south-africa

Kenny, A. (2020, December). *South Africans' stress levels have shot up 56% since start of pandemic according to survey*. https://www.mydynamics.co.za/south-africans-stress-levels-have-shot-up-by-56-since-start-of-pandemic-according-to-survey/

Khair, M., Alsowat, H. H., & Al-Roqi, R. M. (2021). The effectiveness of distance learning (BlackBoard) in pursuing the educational process at Taif University during the COVID-19 pandemic from the viewpoints of teachers and students. *Tobacco Regulatory Science*, *7*(5), 1772–1783. https://doi.org/10.18001/trs.7.5.101

Kil, N., Kim, J., Park, J., & Lee, C. (2021). Leisure boredom, leisure challenge, smartphone use, and emotional distress among US college students: Are they interrelated? *Leisure Studies*, *40*(6), 1–14. https://doi.org/10.1080/02614367.2021.1931414

Kolhar, M., Kazi, R. N. A., & Alameen, A. (2021). Effect of social media use on learning, social interactions, and sleep duration among university students. *Saudi Journal of Biological Sciences*, *28*(4), 2216–2222. https://doi.org/10.1016/j.sjbs.2021.01.010

Kremer, P., Elshaug, C., Leslie, E., Toumbourou, J. W., Patton, G. C., & Williams, J. (2014). Physical activity, leisure-time screen use and depression among children and young adolescents. *Journal of Science and Medicine in Sport*, *17*(2), 183–187. https://doi.org/10.1016/j.jsams.2013.03.012

Krendl, A. C. (2023). Changes in stress predict worse mental health outcomes for college students than does loneliness; evidence from the COVID-19 pandemic. *Journal of American College Health*, *71*(1), 1–4. https://doi.org/10.1080/07448481.2021.1887198

Kruger, D. J., & Djerf, J. M. (2016). High ringxiety: Attachment anxiety predicts experiences of phantom cell phone ringing. *Cyberpsychology, Behavior, and Social Networking*, *19*(1), 56–59. https://doi.org/10.1089/cyber.2015.0406

Kshirsagar, S. V., Mangot, A. G., Murthy, V. S., Deshmukh, A. H., & Tembe, D. V. (2018). Prevalence and pattern of phantom ringing and phantom vibration among medical interns and their relationship with smartphone use and perceived stress. *Indian Journal of Psychological Medicine*, *40*(5), 440-445. https://doi.org/10.4103/ijpsym.ijpsym_141_18

Kuppuswamy, S., & Narayan, P. B. S. (2010). The impact of social networking websites on the education of youth. *International Journal of Virtual Communities and Social Networking*, *2*(1), 67–79. https://doi.org/10.4018/jvcsn.2010010105

Kuss, D. J., Griffiths, M. D., & Binder, J. F. (2013). Internet addiction in students: Prevalence and risk factors. *Computers in Human Behavior*, *29*(3), 959–966. https://doi.org/10.1016/j.chb.2012.12.024

Kuss, D., Griffiths, M., Karila, L., & Billieux, J. (2014). Internet addiction: A systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design*, *20*(25), 4026–4052. https://doi.org/10.2174/13816128113199990617

Lai, F. (2023). Relationship between social media use and social anxiety in college students: Mediation effect of communication capacity. *International Journal of Environmental Research and Public Health*, *20*(4), 3657. https://doi.org/10.3390/ijerph20043657

Lattie, E. G., Lipson, S. K., & Eisenberg, D. (2019). Technology and college student mental health: Challenges and opportunities. *Frontiers in Psychiatry*, *10*, 246–251. https://doi.org/10.3389/fpsyt.2019.00246

Le Roux, D. B., & Parry, D. A. (2019). Off-task media use in academic settings: Cycles of self-regulation failure. *Journal of American College Health*, *69*(2), 1–8. https://doi.org/10.1080/07448481.2019.1656636

Le Roux, D. B., Parry, D. A., Totolo, A., Iyawa, G., Holloway, J., Prenter, A., & Botha, L. (2021). Media multitasking, online vigilance and academic performance among students in three Southern African countries. *Computers & Education*, *160*, 1-13. https://doi.org/10.1016/j.compedu.2020.104056

Lee-Won, R. J., Herzog, L., & Park, S. G. (2015). Hooked on Facebook: The role of social anxiety and need for social assurance in problematic use of Facebook. *Cyberpsychology, Behavior, and Social Networking*, *18*(10), 567–574. https://doi.org/10.1089/cyber.2015.0002

Leodoro, L. (2014). Facebook use and adolescents emotional states of depression, anxiety, and stress. *Health Science Journal*, *8*(1), 80-89.

https://www.researchgate.net/publication/262725734_Facebook_use_and_adolescents%27_emotional_states_of_depression_anxiety_and_stress

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. *Computers in Human Behavior*, *31*(1), 343–350. https://doi.org/10.1016/j.chb.2013.10.049

Leppink, E., Odlaug, B. L., Lust, K., Christenson, G., Derbyshire, K., & Grant, J. E. (2014). Losing control: Assaultive behavior as a predictor of impulse control disorders in young adults. *Comprehensive Psychiatry*, *55*(8), 1831–1836. https://doi.org/10.1016/j.comppsych.2014.07.012

Leung, A. N. M., Law, W., Liang, Y. Y., Au, A. C. L., Li, C., & Ng, H. K. S. (2021). What explains the association between usage of social networking sites (SNS) and depression symptoms? The mediating roles of self-esteem and fear-of-missing-out. *International Journal of Environmental Research and Public Health*, *18*(8), 3916. https://doi.org/10.3390/ijerph18083916

Li, J., Hsu, C. C., & Lin, C. T. (2019). Leisure participation behavior and psychological well-being of elderly adults: An empirical study of Tai Chi Chuan in China. *International Journal of Environmental Research and Public Health*, *16*(18), 3387. https://doi.org/10.3390/ijerph16183387

Li, J., Lepp, A., & Barkley, J. E. (2015). Locus of control and cell phone use: Implications for sleep quality, academic performance, and subjective well-being. *Computers in Human Behavior*, *52*, 450–457. https://doi.org/10.1016/j.chb.2015.06.021

Li, S., & Fan, L. (2022). Media multitasking, depression, and anxiety of college students: Serial mediating effects of attention control and negative information attentional bias. *Frontiers in Psychiatry*, *13*, 1-11. https://doi.org/10.3389/fpsyt.2022.989201

Li, W., Zhao, Z., Chen, D., Peng, Y., & Lu, Z. (2022). Prevalence and associated factors of depression and anxiety symptoms among college students: A systematic review and meta-analysis. *Journal of Child Psychology and Psychiatry*, *63*(11), 1222-1230. https://doi.org/10.1111/jcpp.13606

Limone, P., & Toto, G. A. (2022). Factors that predispose undergraduates to mental issues: A cumulative literature review for future research perspectives. *Frontiers in Public Health*, *10*, 1-12. https://doi.org/10.3389/fpubh.2022.831349

Lin, L., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., Hoffman, B. L., Giles, L. M., & Primack, B. A. (2016). Association between social media use and depression among US young adults. *Depression and Anxiety*, *33*(4), 323–331. https://doi.org/10.1002/da.22466

Lippincott, J. A., & German, N. (2007). *From blue collar to ivory tower: Counseling first-generation, working-class students*. American Counseling Association.

Lipson, S. K., Diaz, Y., Davis, J., & Eisenberg, D. (2023). Mental health among first-generation college students: Findings from the national healthy minds study, 2018–2021. *Cogent Mental Health*, *2*(1), 1-15. https://doi.org/10.1080/28324765.2023.2220358

Lipson, S. K., Zhou, S., Abelson, S., Heinze, J., Jirsa, M., Morigney, J., Patterson, A., Singh, M., & Eisenberg, D. (2022). Trends in college student mental health and help-seeking by race/ethnicity: Findings from the national healthy minds study, 2013–2021. *Journal of Affective Disorders*, *306*, 138–147. https://doi.org/10.1016/j.jad.2022.03.038

Lister, K., Seale, J., & Douce, C. (2021). Mental health in distance learning: A taxonomy of barriers and enablers to student mental wellbeing. *Open Learning: The Journal of*

Open, Distance and E-Learning, *38*(2), 102–116. https://doi.org/10.1080/02680513.2021.1899907

Liu, X.-Q., Guo, Y.-X., Zhang, W.-J., & Gao, W.-J. (2022). Influencing factors, prediction and prevention of depression in college students: A literature review. *World Journal of Psychiatry*, *12*(7), 860–873. https://doi.org/10.5498/wjp.v12.i7.860

Lopez-Fernandez, O., Honrubia-Serrano, L., Freixa-Blanxart, M., & Gibson, W. (2014). Prevalence of problematic mobile phone use in British adolescents. *Cyberpsychology, Behavior, and Social Networking*, *17*(2), 91–98. https://doi.org/10.1089/cyber.2012.0260

Lovell, G. P., Nash, K., Sharman, R., & Lane, B. R. (2015). A cross-sectional investigation of depressive, anxiety, and stress symptoms and health-behavior participation in Australian university students. *Nursing & Health Sciences*, *17*(1), 134–142. https://doi.org/10.1111/nhs.12147

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Psychology Foundation of Australia.

Lukenga, M. P., Billonnet, L., Gaugue, J., & Denis, J. (2023). Exploring female students' perceptions of the use of digital technologies in managing academic stress. *Frontiers in Psychology, 14*, 1-16. https://doi.org/10.3389/fpsyg.2023.1199038

Lukose, J., Mwansa, G., Ngandu, R., & Oki, O. (2023). Investigating the impact of social media usage on the mental health of young adults in Buffalo City, South Africa. *International Journal of Social Science Research and Review*, *6*(6), 303–314. https://doi.org/10.47814/ijssrr.v6i6.1365

Mabasa, M. (2018). *Suicide on campuses: Spate of deaths raises alarm*. Daily Maverick. https://www.dailymaverick.co.za/article/2018-10-28-suicide-on-campus-spate-of-deaths-raises-alarm/

Macaskill, A. (2013). The mental health of university students in the United Kingdom. *British Journal of Guidance & Counselling*, *41*(4), 426–441. https://doi.org/10.1080/03069885.2012.743110

MacLeod, K. B., & Brownlie, E. B. (2014). Mental health and transitions from adolescence to emerging adulthood: Developmental and diversity considerations. *Canadian Journal of Community Mental Health*, *33*(1), 77–86. https://doi.org/10.7870/cjcmh-2014-007

Makhubela, M. (2021). Suicide and depression in university students: A possible epidemic. *South African Journal of Psychology*, *51*(1), 008124632199217. https://doi.org/10.1177/0081246321992179

Mandap, C. M. (2016). Examining gender differences in statistics anxiety among college students. *International Journal of Education and Research*, *4*(6), 357–366.

Mander, J. (2022, March 8). *Qualitative & quantitative research methods*. https://blog.gwi.com/trends/qualitative-vs-quantitative/#:~:text=The%20drawbacks%20of%20quantitative%20research

Maoela, A. L. (2022). *The role of social media and technology usage in the relationship between self-esteem and mental health problems amongst university students* [Master's thesis. University of the Free State]. Kovsie Scholar.

Maree, K. (2019). *First steps in research* (2nd ed.). Van Schaik.

McGrath, J. J., Al-Hamzawi, A., Alonso, J., Altwaijri, Y., Andrade, L. H., Bromet, E. J., Bruffaerts, R., De Almeida, J. M. C., Chardoul, S., Chiu, W. T., Degenhardt, L., Demler, O. V., Ferry, F., Gureje, O., Haro, J. M., Karam, E. G., Karam, G., Khaled, S. M., Kovess-Masfety, V., & Magno, M. (2023). Age of onset and cumulative risk of mental disorders: A cross-national analysis of population surveys from 29 countries. *The Lancet Psychiatry*, *10*(9), 668–681. https://doi.org/10.1016/S2215-0366(23)00193-1

McIntyre, D., Rowland, M., Choi, K., & Sarkin, A. (2014). Gender differences in the relationships between mental health symptoms, impairment, and treatment-related behaviors among college students. *Mental Health & Prevention*, *2*(3-4), 80–85. https://doi.org/10.1016/j.mhp.2014.11.001

McLafferty, M., Lapsley, C. R., Ennis, E., Armour, C., Murphy, S., Bunting, B. P., Bjourson, A. J., Murray, E. K., & O'Neill, S. M. (2017). Mental health, behavioural problems and treatment seeking among students commencing university in Northern Ireland. *PLOS ONE*, *12*(12), e0188785. https://doi.org/10.1371/journal.pone.0188785

McLeod, S. (2020). *Correlation*. Simply Psychology. https://www.simplypsychology.org/correlation.html

Meeks, K., Peak, A. S., & Dreihaus, A. (2021). Depression, anxiety, and stress among students, faculty, and staff. *Journal of American College Health*, *71*(2), 1–7. https://doi.org/10.1080/07448481.2021.1891913

Meffert, S. M. (2021). Global mental health research: Time to integrate basic science. *International Journal of Mental Health and Addiction*, *21*, 841-845. https://doi.org/10.1007/s11469-021-00625-9

Mekary, R. A., Lucas, M., Pan, A., Okereke, O. I., Willett, W. C., Hu, F. B., & Ding, E. L. (2013). Isotemporal substitution analysis for physical activity, television watching, and risk of depression. *American Journal of Epidemiology*, *178*(3), 474–483. https://doi.org/10.1093/aje/kws590

Mentzoni, R. A., Brunborg, G. S., Molde, H., Myrseth, H., Skouverøe, K. J. M., Hetland, J., & Pallesen, S. (2011). Problematic video game use: Estimated prevalence and associations with mental and physical health. *Cyberpsychology, Behavior and Social Networking*, *14*(10), 591–596. https://doi.org/10.1089/cyber.2010.0260

Minkel, J. D., Banks, S., Htaik, O., Moreta, M. C., Jones, C. W., McGlinchey, E. L., Simpson, N. S., & Dinges, D. F. (2012). Sleep deprivation and stressors: Evidence for elevated negative affect in response to mild stressors when sleep deprived. *Emotion*, *12*(5), 1015–1020. https://doi.org/10.1037/a0026871

Motsabi, S., Diale, B. M., & Van Zyl, A. (2020). The role of social support in the persistence of first-year first-generation African students in a higher education institution in South Africa. *South African Journal of Higher Education*, *34*(4), 189-210. https://doi.org/10.20853/34-4-3486

Mpungose, C. B. (2021). Lecturers' reflections on use of Zoom video conferencing technology for e-learning at a South African university in the context of coronavirus. *African Identities*, *21*(2), 266–282. https://doi.org/10.1080/14725843.2021.1902268

Müller, C., El-Ansari, K., & El Ansari, W. (2022). Cross-sectional analysis of mental health among university students: Do sex and academic level matter? *International Journal of Environmental Research and Public Health*, *19*(19), 12670. https://doi.org/10.3390/ijerph191912670

Nadeem, M., & Shakir, M. (2018). Stress, smartphone use, life satisfaction and learning performance: A study among young college adults. *SUIT Journal of Social Sciences and Humanities*, *3*(1&2), 109-117. https://journal.suit.edu.pk/index.php/jossh/article/view/405

Naslund, J. A., Bondre, A., Torous, J., & Aschbrenner, K. A. (2020). Social media and mental health: Benefits, risks, and opportunities for research and practice. *Journal of Technology in Behavioral Science*, *5*(3), 245–257. https://doi.org/10.1007/s41347-020-00134-x

National Institute of Mental Health (NIMH). (2023, March). *Mental illness*. https://www.nimh.nih.gov/health/statistics/mental-illness#:~:text=males%20(4.0%25).-

Nel, E. N. (2021). *Emotional intelligence, adjustment, media and technology usage, and sex as predictors of psychological well-being amongst undergraduate university students* [Master's thesis, University of the Free State]. Kovsie Scholar.

Newman, T. (2018, February 7). *Sex and gender: Meanings, definition, identity, and expression*. Medical News Today. https://www.medicalnewstoday.com/articles/232363

Noel, J. K., Lakhan, H. A., Sammartino, C. J., & Rosenthal, S. R. (2021). Depressive and anxiety symptoms in first generation college students. *Journal of American College Health*, *71*(6), 1906–1915. https://doi.org/10.1080/07448481.2021.1950727

Nogueira, M. J., Sequeira, C., & Sampaio, F. (2021). Gender differences in mental health, academic life satisfaction and psychological vulnerability in a sample of college freshmen: A cross-sectional study. *Journal of Gender Studies*, *31*(2), 1–10. https://doi.org/10.1080/09589236.2021.1979945

Núñez-Peña, M. I., Suárez-Pellicioni, M., & Bono, R. (2016). Gender differences in test anxiety and their impact on higher education students' academic achievement. *Procedia - Social and Behavioral Sciences*, *228*, 154–160. https://doi.org/10.1016/j.sbspro.2016.07.023

Nurudeen, M., Abdul-Samad, S., Owusu-Oware, E., Koi-Akrofi, G. Y., & Tanye, H. A. (2022). Measuring the effect of social media on student academic performance using a social media influence factor model. *Education and Information Technologies*, *28*, 1165-1188. https://doi.org/10.1007/s10639-022-11196-0

Nyst, A. (2023, July 14). *134 social media statistics you need to know for 2023*. Search Engine Journal. https://www.searchenginejournal.com/social-media-statistics/480507/#close

O'Dea, X. C., & Stern, J. (2022). Virtually the same?: Online higher education in the post Covid-19 era. *British Journal of Educational Technology*, *53*(3), 433-442. https://doi.org/10.1111/bjet.13211

Ogunmodede, J. A., Dele-Ojo, B. F., Ogunmodede, A. J., Buhari, O. I. N., Agede, O. A., Bojuwoye, M. O., Bello, H. A., Olatunji, A. G., & Odeigah, L. O. (2023). The influence of smartphone use on psychological distress in university undergraduates. *Journal of Education and Community Health*, *10*(2), 79–87. https://doi.org/10.34172/jech.2023.2314

Olasupo, M. O., Idemudia, E. S., & Dimatkakso, M. (2018). Adjustment, psychological well-being and mental health of first year students in a South African university. *North American Journal of Psychology*, *20*(1), 55–68. https://www.researchgate.net/publication/323416747_Adjustment_psychological_well-being_and_mental_health_of_first_year_students_in_a_South_African_university

Olola, T. M., Asukwo, A. U.-A., & Odufuwa, F. (2022). Investigation of the psychological effects of social media use among students in Minnesota, United States of America. *Matondang Journal*, *2*(1), 11–19. https://doi.org/10.33258/matondang.v2i1.804

Orgaz, F., Moral, S., & Domínguez, C. M. (2018). Student's attitude and perception with the use of technology in the university. *Propósitos Y Representaciones*, *6*(2), 253. https://doi.org/10.20511/pyr2018.v6n2.230

Orsal, O., Orsal, O., Unsal, A., & Ozalp, S. S. (2013). Evaluation of internet addiction and depression among university students. *Procedia - Social and Behavioral Sciences*, *82*, 445–454. https://doi.org/10.1016/j.sbspro.2013.06.291

Ortiz-Ospina, E., & Roser, M. (2023). *The rise of social media*. Our World in Data. https://ourworldindata.org/rise-of-social-media#article-citation

Osisanwo, T., Ehioghae, M., & Abdulsalaam, T. (2020). Computer anxiety as correlate of use of information technology tools among undergraduates of library and information science in Tai Solarin University of Education, Ijagun, Ogun State. *Information Impact: Journal of Information and Knowledge Management*, *10*(2), 18-38. https://doi.org/10.4314/iijikm.v10i2.2

Oxford University Press. (1989). *The Oxford English dictionary* (2nd ed.). Clarendon Press.

Özgür, H. (2016). Adapting the Media and Technology Usage and Attitudes Scale to Turkish. *Educational Sciences: Theory & Practice*, *16*(5), 1711-1715. https://doi.org/10.12738/estp.2016.5.0085

Ozkan, M., & Solmaz, B. (2015). Mobile addiction of generation Z and its effects on their social lives. *Procedia - Social and Behavioral Sciences*, *205*(1), 92–98. https://doi.org/10.1016/j.sbspro.2015.09.027

Panda, Y., & Azeem, K. (2022). Comparative study of mental health among male and female college students. *Revista Romaneasca Pentru Educatie Multidimensionala*, *14*(4), 121–130. https://doi.org/10.18662/rrem/14.4/632

Panova, T., Carbonell, X., Chamarro, A., & Puerta-Cortés, D. X. (2019). Specific smartphone uses and how they relate to anxiety and depression in university students: A cross-cultural perspective. *Behaviour & Information Technology*, *39*(9), 944–956. https://doi.org/10.1080/0144929x.2019.1633405

Pantic, I. (2014). Online social networking and mental health. *Cyberpsychology, Behavior, and Social Networking*, *17*(10), 652–657. https://doi.org/10.1089/cyber.2014.0070

Park, S., Hong, K.-E. M., Park, E. J., Ha, K. S., & Yoo, H. J. (2012). The association between problematic internet use and depression, suicidal ideation and bipolar disorder

symptoms in Korean adolescents. *Australian & New Zealand Journal of Psychiatry, 47*(2), 153–159. https://doi.org/10.1177/0004867412463613

Parlak Sert, H., & Başkale, H. (2022). Students' increased time spent on social media, and their level of coronavirus anxiety during the pandemic predict increased social media addiction. *Health Information & Libraries Journal*, *40*(3), 262-274. https://doi.org/10.1111/hir.12448

Parnell, B. (2018, January 16). *Is social media hurting your mental health? (Transcript)*. The Singju Post. https://singjupost.com/is-social-media-hurting-your-mental-health-bailey-parnell-tedxryersonu/?singlepage=1

Pease, J. L. (2015). *Mental health outcomes of first generation college students: Is generational status associated with increased risk for depression and anxiety?* [Doctoral Thesis, University of Denver]. Digital Commons.

Pedroza, J. A. (2017). *The impact of media and technology use on depression, anxiety, and stress, independent of physical activity and unhealthy eating habits in college students* [Master's Thesis, California State University]. Scholar Works.

Petrides, K. V. (2010). Trait emotional intelligence theory. *Industrial and Organizational Psychology*, *3*(2), 136–139. https://doi.org/10.1111/j.1754-9434.2010.01213.x

Petrocelli, J. V. (2003). Hierarchical multiple regression in counseling research: Common problems and possible remedies. *Measurement and Evaluation in Counseling and Development*, *36*(1), 9–22. https://doi.org/10.1080/07481756.2003.12069076

Pillay, A. L., Thwala, J. D., & Pillay, I. (2020). Depressive symptoms in first year students at a rural South African university. *Journal of Affective Disorders*, *265*, 579–582. https://doi.org/10.1016/j.jad.2019.11.094

Potter, D., Jayne, D., & Britt, S. (2020). Financial anxiety among college students: The role of generational status. *Journal of Financial Counseling and Planning*, *31*(2), JFCP-17-00033. https://doi.org/10.1891/jfcp-17-00033

Prasad, S., Souabni, S. A., Anugwom, G., Aneni, K., Anand, A., Urhi, A., Obi-Azuike, C., Gibson, T., Khan, A., & Oladunjoye, A. F. (2023). Anxiety and depression amongst youth as adverse effects of using social media: A review. *Annals of Medicine and Surgery*, *85*(8), 3974–3981. https://doi.org/10.1097/ms9.0000000000001066

Prasetyanto, D., Rizki, M., & Sunitiyoso, Y. (2022). Online learning participation intention after COVID-19 pandemic in Indonesia: Do students still make trips for online class? *Sustainability*, *14*(4), 2-18. https://doi.org/10.3390/su14041982

Pretorius, C., Chambers, D., & Coyle, D. (2019). Young people, online help-seeking and mental health difficulties: A systematic narrative review (Preprint). *Journal of Medical Internet Research*, *21*(11), 1-17. https://doi.org/10.2196/13873

Primack, B. A., Swanier, B., Georgiopoulos, A. M., Land, S. R., & Fine, M. J. (2009). Association between media use in adolescence and depression in young adulthood. *Archives of General Psychiatry*, *66*(2), 181–188. https://doi.org/10.1001/archgenpsychiatry.2008.532

Prizant-Passal, S., Shechner, T., & Aderka, I. M. (2016). Social anxiety and internet use – A meta-analysis: What do we know? What are we missing? *Computers in Human Behavior*, *62*, 221–229. https://doi.org/10.1016/j.chb.2016.04.003

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, *29*(4), 1841–1848. https://doi.org/10.1016/j.chb.2013.02.014

Puschmann, C. (2019). An end to the wild west of social media research: A response to Axel Bruns. *Information, Communication & Society*, *22*(11), 1582–1589. https://doi.org/10.1080/1369118x.2019.1646300

Rajbhandari-Thapa, J., Chiang, K., Lee, M. C., Treankler, A., Padilla, H., Vall, E. A., & Fedrick, M. (2023). Depression and anxiety among college students at historically black and predominantly white universities during the COVID-19 pandemic: A cross-sectional study. *Journal of American College Health*, 1–8. https://doi.org/10.1080/07448481.2023.2230297

Raouf, S. Y. A., Gabr, H. M., Al-Wutayd, O., & Al-Batanony, M. A. (2022). Video game disorder and mental wellbeing among university students: A cross-sectional study. *Pan African Medical Journal*, *41*(89), 1-12. https://doi.org/10.11604/pamj.2022.41.89.31322

Ratten, V. (2023). The post COVID-19 pandemic era: Changes in teaching and learning methods for management educators. *The International Journal of Management Education*, *21*(2), 1-8. https://doi.org/10.1016/j.ijme.2023.100777

Raza, S. A., Qazi, W., Umer, B., & Khan, K. A. (2020). Influence of social networking sites on life satisfaction among university students: A mediating role of social benefit and social overload. *Health Education*, *120*(2), 141–164. https://doi.org/10.1108/he-07-2019-0034

Riecher-Rössler, A. (2017). Sex and gender differences in mental disorders. *The Lancet Psychiatry*, *4*(1), 8–9. https://doi.org/10.1016/s2215-0366(16)30348-0

Ritchie, H., & Roser, M. (2018). *Mental health*. Our World in Data. https://ourworldindata.org/mental-health#citation

Robinson, L., & Smith, M. (2023, March 29). *Social media and mental health*. Help Guide. https://www.helpguide.org/articles/mental-health/social-media-and-mental-health.htm

Romer, D., Bagdasarov, Z., & More, E. (2013). Older versus newer media and the well-being of United States youth: Results from a national longitudinal panel. *Journal of Adolescent Health, 52*(5), 613–619. https://doi.org/10.1016/j.jadohealth.2012.11.012

Rosen, L. D., Lim, A. F., Felt, J., Carrier, L. M., Cheever, N. A., Lara-Ruiz, J. M., Mendoza, J. S., & Rokkum, J. (2014). Media and technology use predicts ill-being among children, preteens and teenagers independent of the negative health impacts of exercise and eating habits. *Computers in Human Behavior*, *35*, 364–375. https://doi.org/10.1016/j.chb.2014.01.036

Rosen, L. D., Whaling, K., Carrier, L. M., Cheever, N. A., & Rokkum, J. (2013). The Media and Technology Usage and Attitudes Scale: An empirical investigation. *Computers in Human Behavior*, *29*(6), 2501–2511. https://doi.org/10.1016/j.chb.2013.06.006

Ross, A., & Willson, V. L. (2017). Hierarchical multiple regression analysis using at least two sets of variables (in two blocks). In *Basic and Advanced Statistical Tests*, (pp. 61–74). Sense Publishers, Rotterdam. https://doi.org/10.1007/978-94-6351-086-8_10

Rousseau, K.-L., Thompson, S., Pileggi, L.-A., Henry, M., & Thomas, K. G. (2020). Trends in the prevalence and severity of depressive symptoms among undergraduate students at a South African University, 2016–2019. *South African Journal of Psychology*, *51*(1), 67–80. https://doi.org/10.1177/0081246320977759

Rutter, L. A., Thompson, H. M., Howard, J., Riley, T. N., De Jesús-Romero, R., & Lorenzo-Luaces, L. (2020). Social media use, physical activity, and internalizing symptoms in adolescence: Cross-sectional analysis (Preprint). *JMIR Mental Health*, *8*(9), 1-14. https://doi.org/10.2196/26134

Sabbah, H., Berbari, R., Khamis, R., Zorkot, D., Sabbah, S., Droubi, N., & Sabbah, I. (2019). The social media and technology addiction and its associated factors among university students in Lebanon using the Media and Technology Usage and Attitudes

Scale (MTUAS). *Journal of Computer and Communications*, *7*(11), 88–106. https://doi.org/10.4236/jcc.2019.711007

Salimi, N., Gere, B., Talley, W., & Irioogbe, B. (2023). College students mental health challenges: Concerns and considerations in the COVID-19 pandemic. *Journal of College Student Psychotherapy*, *37*(1), 1–13. https://doi.org/10.1080/87568225.2021.1890298

Sallehuddin, H., Sawai, R. P., Abdul Aziz, A. R., & Kasmani, M. F. (2021). Association between social media use and depression among university students. *'Abqari Journal*, *25*(1), 18–32. https://doi.org/10.33102/abqari.vol24no2.311

Sankar, V. S. (2020). Impact of social media on academic performance of university students: A field survey of academic development. *TechnoLearn an International Journal of Educational Technology*, *10*(1&2), 1-7. https://doi.org/10.30954/2231-4105.02.2020.1

Sansone, R. A., & Sansone, L. A. (2013). Cell phones: The psychosocial risks. *Innovations in Clinical Neuroscience*, *10*(1), 33–37. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3579483/

Schreiber, B. (2018). Campus report mental health in the spotlight. *Journal of Student Affairs in Africa*, *6*(2), 121–127. https://doi.org/10.24085/jsaa.v6i2.3318

Schultz, M. (2023). *What age group uses social media the most?* TubeKarma. https://Www.tubekarma.com/. https://www.tubekarma.com/what-age-group-uses-social-media-the-most/#:~:text=According%20to%20current%20data%2C%20globally

Schuyler, S. W., Childs, J. R., & Poynton, T. A. (2021). Promoting success for first-generation students of color: The importance of academic, transitional adjustment,

and mental health supports. *Journal of College Access*, *6*(1), 11-25. https://scholarworks.wmich.edu/jca/vol6/iss1/4

Sean, H. (2018). *The effects of social media on depression, anxiety and stress* [Honours Thesis, Dublin Business School]. DBS eSource.

Seehuus, M., Moeller, R. W., & Peisch, V. (2019). Gender effects on mental health symptoms and treatment in college students. *Journal of American College Health*, *69*(1), 1–8. https://doi.org/10.1080/07448481.2019.1656217

Seminario, P. (2022). *The sex difference in depressive symptoms among college students*. [Master's thesis, Seattle acific University]. Seattle Pacific Library. https://digitalcommons.spu.edu/rpsy_etd/1

Shannon, H., Bush, K., Villeneuve, P., Hellemans, K., & Guimond, S. (2021). Problematic social media use in adolescents and young adults: A meta-analysis (Preprint). *JMIR Mental Health*, *9*(4). 1-12. https://doi.org/10.2196/33450

Sharp, J., & Theiler, S. (2018). A review of psychological distress among university students: Pervasiveness, implications and potential points of intervention. *International Journal for the Advancement of Counselling*, *40*(3), 193–212. https://doi.org/10.1007/s10447-018-9321-7

Shayan, N. A., Niazi, A.-R., Was, A. M., & Özcebe, H. (2021). Depression, Anxiety, and Stress Scales 42 (DASS-42) in Dari-Language: Validity and reliability study in adults, Herat, Afghanistan. *Bezmialem Science*, *9*(3), 356–362. https://doi.org/10.14235/bas.galenos.2020.4250

She, R., Kit han Mo, P., Li, J., Liu, X., Jiang, H., Chen, Y., Ma, L., & Tak fai Lau, J. (2023). The double-edged sword effect of social networking use intensity on problematic social networking use among college students: The role of social skills and social

anxiety. *Computers in Human Behavior*, *140*, 2-10. https://doi.org/10.1016/j.chb.2022.107555

Sheldon, E., Simmonds-Buckley, M., Bone, C., Mascarenhas, T., Chan, N., Wincott, M., Gleeson, H., Sow, K., Hind, D., & Barkham, M. (2021). Prevalence and risk factors for mental health problems in university undergraduate students: A systematic review with meta-analysis. *Journal of Affective Disorders*, *287*, 282–292. https://doi.org/10.1016/j.jad.2021.03.054

Slimmen, S., Timmermans, O., Mikolajczak-Degrauwe, K., & Oenema, A. (2022). How stress-related factors affect mental wellbeing of university students A cross-sectional study to explore the associations between stressors, perceived stress, and mental wellbeing. *PLOS ONE*, *17*(11), 1-16. https://doi.org/10.1371/journal.pone.0275925

Smith, D., & McLellan, R. (2023). Mental health problems in first-generation university students: A scoping review. *Review of Education*, *11*(3), 1-28. https://doi.org/10.1002/rev3.3418

Smith, M. K. (2022, September 25). *What is "media technology"?* Moore Kingston Smith. https://mooreks.co.uk/insights/what-is-media-technology/#:~:text=Media%20technology%20refers%20to%20the

South African Depression and Anxiety Group. (2019). *Depression – The silent killer*. https://www.sadag.org/index.php?option=com_content&view=article&id=1877&Itemid=142

Spagnolo, P. A., Manson, J. E., & Joffe, H. (2020). Sex and gender differences in health: What the COVID-19 pandemic can teach us. *Annals of Internal Medicine*, *173*(5), 385-386. https://doi.org/10.7326/m20-1941

Stangor, C. (2015). *Research methods for the behavioral sciences* (5th ed.). Cengage.

Statista Research Department. (2023). *Distribution of devices used to access the internet in South Africa as of the 3rd quarter of 2022*. Statista. https://www.statista.com/statistics/1312851/internet-access-by-device-in-south-africa/

Stebleton, M. J., Soria, K. M., & Huesman, R. L. (2014). First-generation students' sense of belonging, mental health, and use of counseling services at public research universities. *Journal of College Counseling*, *17*(1), 6–20. https://doi.org/10.1002/j.2161-1882.2014.00044.x

Steimer, T. (2022). The biology of fear- and anxiety-related behaviors. *Cerebral Aging*, *4*(3), 231–249. https://doi.org/10.31887/dcns.2002.4.3/tsteimer

Sternberg, N., Luria, R., Chandhok, S., Vickers, B., Kross, E., & Sheppes, G. (2020). When facebook and finals collide - procrastinatory social media usage predicts enhanced anxiety. *Computers in Human Behavior*, *109*, 106358. https://doi.org/10.1016/j.chb.2020.106358

Steyn, H. S. (2005). *Handleiding vir die bepaling van effekgrootte-indekse en praktiese betekenisvolheid*. https://www.puk.ac.za/fakulteite/natuur/skd/index.html

Storrie, K., Ahern, K., & Tuckett, A. (2010). A systematic review: Students with mental health problems: A growing problem. *International Journal of Nursing Practice*, *16*(1), 1–6. https://doi.org/10.1111/j.1440-172x.2009.01813.x

Studen, L., & Tiberius, V. (2020). Social media, Quo Vadis? Prospective development and implications. *Future Internet*, *12*(9), 146-168. https://doi.org/10.3390/fi12090146

Su, W., Han, X., Yu, H., Wu, Y., & Potenza, M. N. (2020). Do men become addicted to internet gaming and women to social media? A meta-analysis examining gender-related differences in specific internet addiction. *Computers in Human Behavior*, *113*, 1-11. https://doi.org/10.1016/j.chb.2020.106480

Sun, L. (2023). Social media usage and students' social anxiety, loneliness and well-being: Does digital mindfulness-based intervention effectively work? *BMC Psychology*, *11*(1), 362-374. https://doi.org/10.1186/s40359-023-01398-7

Syed, A., Syed, S. A., & Khan, M. (2018). Frequency of depression, anxiety, and stress among the undergraduate physiotherapy students. *Pakistan Journal of Medical Sciences*, *34*(2), 468-471. https://doi.org/10.12669/pjms.342.12298

Tadi, N. F., Pillay, K., Ejoke, U. P., & Khumalo, I. P. (2022). Sex differences in depression and anxiety symptoms: Measurement invariance, prevalence, and symptom heterogeneity among university students in South Africa. *Frontiers in Psychology*, *13*, 1-14. https://doi.org/10.3389/fpsyg.2022.873292

Taylor, C. B., Fitzsimmons-Craft, E. E., & Graham, A. K. (2020). Digital technology can revolutionize mental health services delivery: The COVID-19 crisis as a catalyst for change. *International Journal of Eating Disorders*, *53*(7), 1155–1157. https://doi.org/10.1002/eat.23300

Thapa, R., & Subedi, S. (2018). Social media and depression. *Journal of Psychiatrists' Association of Nepal*, *7*(2), 1–4. https://www.researchgate.net/publication/334037593_Social_Media_and_Depression

Thomée, S. (2018). Mobile Phone Use and Mental Health. A Review of the Research That Takes a Psychological Perspective on Exposure. *International Journal of Environmental Research and Public Health*, *15*(12), 2692–2698. https://doi.org/10.3390/ijerph15122692

Thomée, S., Eklöf, M., Gustafsson, E., Nilsson, R., & Hagberg, M. (2007). Prevalence of perceived stress, symptoms of depression and sleep disturbances in relation to information and communication technology (ICT) use among young adults – an

explorative prospective study. *Computers in Human Behavior*, *23*(3), 1300–1321. https://doi.org/10.1016/j.chb.2004.12.007

Thomas, L., Orme, E., & Kerrigan, F. (2019). Student loneliness: The role of social media through life transitions. *Computers & Education*, *146*, 1-11. https://doi.org/10.1016/j.compedu.2019.103754

Thomée, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults: A prospective cohort study. *BMC Public Health*, *11*(66), 1-11. https://doi.org/10.1186/1471-2458-11-66

Thompson, M., Pawson, C., & Evans, B. (2021). Navigating entry into higher education: the transition to independent learning and living. *Journal of Further and Higher Education*, *45*(10), 1–13. https://doi.org/10.1080/0309877x.2021.1933400

Tiggemann, M., Hayden, S., Brown, Z., & Veldhuis, J. (2018). The effect of Instagram "likes" on women's social comparison and body dissatisfaction. *Body Image*, *26*, 90–97. https://doi.org/10.1016/j.bodyim.2018.07.002

Tondeur, J., Van de Velde, S., Vermeersch, H., & Van Houtte, M. (2016). Gender differences in the ICT profile of university students: A quantitative analysis. *Journal of Diversity and Gender Studies*, *3*(1), 57-77. https://doi.org/10.11116/jdivegendstud.3.1.0057

Torales, J., Torres-Romero, A. D., Di Giuseppe, M. F., Rolón-Méndez, E. R., Martínez-López, P. L., Heinichen-Mansfeld, K. V., Barrios, I., O'Higgins, M., Almirón-Santacruz, J., Melgarejo, O., Ruiz Díaz, N., Castaldelli-Maia, J. M., & Ventriglio, A. (2022). Technostress, anxiety, and depression among university students: A report from Paraguay. *International Journal of Social Psychiatry*, *68*(5), 1063–1070. https://doi.org/10.1177/00207640221099416

Torii, K., O'Connell, M., & University, V. (2017). *Preparing young people for the future of work: Policy roundtable report.* Victoria University, Mitchell Institute for Health And Education Policy.

Toutkoushian, R. K., Stollberg, R. A., & Slaton, K. A. (2018). Talking 'Bout my generation: Defining "first-generation college students" in higher education research. *Teachers College Record: The Voice of Scholarship in Education*, *120*(4), 1–38. https://doi.org/10.1177/016146811812000407

Tripathy, J. P. (2013). Secondary data analysis: Ethical issues and challenges. *Iranian Journal of Public Health*, *42*(12), 1478–1479. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4441947/#:~:text=Concerns%20about%20secondary%20use%20of,of%20identifying%20information%20in%20it.

Truschel, J. (2018, July 24). *Depression definition and DSM-5 diagnostic criteria*. Psycom. https://www.psycom.net/depression/major-depressive-disorder/dsm-5-depression-criteria

Tseng, M.-C. M., Gau, S. S.-F., Tseng, W.-L., Hwu, H.-G., & Lee, M.-B. (2013). Co-occurring eating and psychiatric symptoms in Taiwanese college students: Effects of gender and parental factors. *Journal of Clinical Psychology*, *70*(3), 224–237. https://doi.org/10.1002/jclp.22014

Tsugawa, S., Kikuchi, Y., Kishino, F., Nakajima, K., Itoh, Y., & Ohsaki, H. (2015). *Recognizing depression from Twitter activity*. Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems - CHI '15. https://doi.org/10.1145/2702123.2702280

Twenge, J. M. (2019). More time on technology, less happiness? Associations between digital-media use and psychological well-being. *Current Directions in Psychological Science*, *28*(4), 372–379. https://doi.org/10.1177/0963721419838244

Twenge, J. M., & Martin, G. N. (2020). Gender differences in associations between digital media use and psychological well-being: Evidence from three large datasets. *Journal of Adolescence, 79*(1), 91–102. https://doi.org/10.1016/j.adolescence.2019.12.018

Udhayakumar, P., & Illango, P. (2018). Psychological wellbeing among college students. *Journal of Social Work Education and Practice*, *3*(2), 79–89. https://www.researchgate.net/publication/359369816_Psychological_Wellbeing_among_College_Students

Vaingankar, J. A., Dam, R. M. van, Samari, E., Chang, S., Seow, E., Chua, Y. C., Luo, N., Verma, S., & Subramaniam, M. (2022). Social media–driven routes to positive mental health among youth: Qualitative enquiry and concept mapping study. *JMIR Pediatrics and Parenting*, *5*(1), 1–14. https://doi.org/10.2196/32758

Valadez, J. J., & Ferguson, C. J. (2012). Just a game after all: Violent video game exposure and time spent playing effects on hostile feelings, depression, and visuospatial cognition. *Computers in Human Behavior*, *28*(2), 608–616. https://doi.org/10.1016/j.chb.2011.11.006

Valkenburg, P. M., Meier, A., & Beyens, I. (2021). Social media use and its impact on adolescent mental health: An umbrella review of the evidence. *Current Opinion in Psychology*, *44*, 58-68. https://doi.org/10.1016/j.copsyc.2021.08.017

Vallone, F., Galvin, J., Francesca, M., Akhtar, A., Chua, S., Ghio, E., Giovazolias, T., Kazakou, Z., Kritikou, M., Koutra, K., Kovacevic, S., Lee-Treweek, G., Mašková, I., Mavritsaki, E., Nastic, J., Plassová, M., Stuchlíková, I., & Zurlo, M. C. (2023). Technostress and academic motivation: Direct and indirect effects on university students' psychological health. *Frontiers in Psychology*, *14*, 1-16. https://doi.org/10.3389/fpsyg.2023.1211134

Van der Walt, S., Mabaso, W. S., Davids, E. L., & De Vries, P. J. (2020). The burden of depression and anxiety among medical students in South Africa: A cross-sectional survey at the University of Cape Town. *South African Medical Journal*, *110*(1), 69–76. 10.7196/SAMJ.2019.v110i1.14151

Van Tonder, J. I. (2020). *Predictors of loneliness amongst university students* [Master's thesis, University of the Free State]. Kovsie Scholar.

Van Tonder, J. I., Jordaan, J., & Esterhuyse, K. (2023). Self-esteem, interpersonal communication competence, and media and technology usage as predictors of loneliness among university students. *SAGE Open*, *13*(1), 1-13. https://doi.org/10.1177/21582440221148379

Vannucci, A., Flannery, K. M., & Ohannessian, C. M. (2017). Social media use and anxiety in emerging adults. *Journal of Affective Disorders*, *207*, 163–166. https://doi.org/10.1016/j.jad.2016.08.040

Vaterlaus, J. M., Patten, E. V., Roche, C., & Young, J. A. (2015). #Gettinghealthy: The perceived influence of social media on young adult health behaviors. *Computers in Human Behavior*, *45*(1), 151–157. https://doi.org/10.1016/j.chb.2014.12.013

Veissière, S. P. L., & Stendel, M. (2018). Hypernatural monitoring: A social rehearsal account of smartphone addiction. *Frontiers in Psychology*, *9*(10), 1-10. https://doi.org/10.3389/fpsyg.2018.00141

Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., Ybarra, O., Jonides, J., & Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology. General*, *144*(2), 480–488. https://doi.org/10.1037/xge0000057

Vetter, T. (2017). Descriptive statistics: Reporting the answers to the 5 basic questions of who, what, why, when, where, and a sixth, so what? *Anesthesia & Analgesia*, *125*(5), 1797–1802. https://doi.org/10.1213/ane.0000000000002471

Vogt, W. P. (2005). *Dictionary of statistics and methodology*. Sage.

Volkov, D., & Abaturova, O. (2022). Mental health of university students: aspect of gender differences. *Baltic Journal of Legal and Social Sciences*, *2*, 39–48. https://doi.org/10.30525/2592-8813-2021-2-5

Vuelvas-Olmos, C. R., Sánchez-Vidaña, D. I., & Cortés-Álvarez, N. Y. (2022). Gender-based analysis of the association between mental health, sleep quality, aggression, and physical activity among university students during the COVID-19 outbreak. *Psychological Reports*, 126(5), 2212-2236. https://doi.org/10.1177/00332941221086209

Vultaggio, G. (2021). *The most anxious generation": The relationship between Gen Z students, social media, and anxiety* [Honours thesis, State University of New York]. SUNY. http://hdl.handle.net/20.500.12648/1916

Walsh, D. (2022, September 14). *Study: Social media use linked to decline in mental health*. MIT Sloan School of Management. https://mitsloan.mit.edu/ideas-made-to-matter/study-social-media-use-linked-to-decline-mental-health

Wang, W., Nepal, S., Huckins, J. F., Hernandez, L., Vojdanovski, V., Mack, D., Plomp, J., Pillai, A., Obuchi, M., Da Silva, A., Murphy, E., Hedlund, E., Rogers, C., Meyer, M., & Campbell, A. (2022). First-gen lens: Assessing mental health of first-generation students across their first year at college using mobile sensing. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, *6*(2), 1–32. https://doi.org/10.1145/3543194

Wang, Y., Xu, J., & Xie, T. (2023). Social media overload and anxiety among university students during the COVID-19 Omicron wave lockdown: A cross-sectional study in Shanghai, China, 2022. *International Journal of Public Health*, *67*, 1-10. https://doi.org/10.3389/ijph.2022.1605363

Waqas, A., Khurshid, Z., Ali, M., & Khaliq, H. (2018). Association between usage of social media and depression among young adults. *Journal of Management Info*, *5*(4), 26–30. https://doi.org/10.31580/jmi.v5i4.115

Wei, Q. (2023). Evaluation on college students' anxiety and social media usage during Shanghai closure. *Science Insights Education Frontiers*, *15*(1), 2227–2245. https://doi.org/10.15354/sief.23.or123

Westberg, K. H., Nyholm, M., Nygren, J. M., & Svedberg, P. (2022). Mental health problems among young people: A scoping review of help-seeking. *International Journal of Environmental Research and Public Health*, *19*(3), 1430-1445. https://doi.org/10.3390/ijerph19031430

William, K. (2022, January 25). *What is SPSS? Definition, features, types, and use cases*. SurveySparrow. https://surveysparrow.com/blog/what-is-spss/

Wiradhany, W., & Koerts, J. (2019). Everyday functioning-related cognitive correlates of media multitasking: a mini meta-analysis. *Media Psychology*, *24*(2), 1–28. https://doi.org/10.1080/15213269.2019.1685393

Wolf, M., Sims, J., & Yang, H. (2018, March 20). *Social media? What social media?* [Conference session]. Academy for Information Systems Conference Proceedings, Springs, United Kingdom. https://aisel.aisnet.org/ukais2018/3

Wong, H. Y., Mo, H. Y., Potenza, M. N., Chan, M. N. M., Lau, W. M., Chui, T. K., Pakpour, A. H., & Lin, C.-Y. (2020). Relationships between severity of internet gaming disorder, severity of problematic social media use, sleep quality and psychological

distress. *International Journal of Environmental Research and Public Health*, *17*(6), 1879-1892. https://doi.org/10.3390/ijerph17061879

Wood, D., Crapnell, T., Lau, L., Bennett, A., Lotstein, D., Ferris, M., & Kuo, A. (2017). Emerging adulthood as a critical stage in the life course. In Halfon, N., Forrest, C., Lerner, R., Faustman, E. (Eds.), *Handbook of Life Course Health Development* (pp. 123–143). Springer, Cham. https://doi.org/10.1007/978-3-319-47143-3_7

World Health Organisation. (2020). *"Depression: Let's talk" says WHO, as depression tops list of causes of ill health*. World Health Organization. https://www.who.int/news/item/30-03-2017--depression-let-s-talk-says-who-as-depression-tops-list-of-causes-of-ill-health

World Health Organization. (2004). *Promoting mental health: Concepts, emerging evidence, practice: Summary report.* World Health Organisation. https://apps.who.int/iris/bitstream/handle/10665/42940/9241591595.pdf

World Health Organization. (2023a, February 21). *Stress*. World Health Organization. https://www.who.int/news-room/questions-and-answers/item/stress

World Health Organization. (2023b, March). *Depression*. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/depression

Xu, S., Wang, Z. J., & David, P. (2016). Media multitasking and well-being of university students. *Computers in Human Behavior*, *55*, 242–250. https://doi.org/10.1016/j.chb.2015.08.040

Yadav, K. K., & Reddy, L. J. (2023). Psychological effects of technology on college students. *Journal of Clinical Otorhinolaryngology, Head, and Neck Surgery*, *27*(1), 1805–1816. https://www.researchgate.net/publication/370129184_PSYCHOLOGICAL_EFFECTS_OF_TECHNOLOGY_ON_COLLEGE_STUDENTS

Yakasai, A. M., Dermody, G., Maharaj, S. S., Hassan, A. B., Abdullahi, A., Usman, J. S., & Danazumi, M. S. (2022). Prevalence of psychological symptoms and their correlates among physiotherapy clinical students: A cross-sectional study. *South African Journal of Physiotherapy*, *78*(1), 1-8. https://doi.org/10.4102/sajp.v78i1.1795

Yan, Y., Wang, X., Zhang, R., & Zhang, Y. (2022). The relationship between leisure activities and the mental health of college students during the COVID-19 pandemic. *World Leisure Journal*, *65*(1), 1–24. https://doi.org/10.1080/16078055.2022.2158924

Yang, L. (2022, November 3). *6.2: Multiple Regression*. Statistics LibreTexts. https://stats.libretexts.org/Courses/Kansas_State_University/EDCEP_917%3A_Experimental_Design_(Yang)/06%3A_Multiple_Linear_Regression/6.02%3A_Multiple_Regression_Equation

Yen, J. Y., Yeh, Y. C., Wang, P. W., Liu, T. L., Chen, Y. Y., & Ko, C. H. (2017). Emotional regulation in young adults with internet gaming disorder. *International Journal of Environmental Research and Public Health*, *15*(1), 30-41. https://doi.org/10.3390/ijerph15010030

Yoon, S., Kleinman, M., Mertz, J., & Brannick, M. (2019). Is social network site usage related to depression? A meta-analysis of Facebook–depression relations. *Journal of Affective Disorders*, *248*, 65–72. https://doi.org/10.1016/j.jad.2019.01.026

Yu, Y., Yan, W., Yu, J., Xu, Y., Wang, D., & Wang, Y. (2022). Prevalence and associated factors of complains on depression, anxiety, and stress in university students: An extensive population-based survey in China. *Frontiers in Psychology*, *13*, 1-11. https://doi.org/10.3389/fpsyg.2022.842378

Zauderer, S. (2022, October 7). *67 Workplace stress statistics in 2022*. https://www.crossrivertherapy.com/stress-statistics-and-facts

Zeeni, N., Doumit, R., Abi Kharma, J., & Sanchez-Ruiz, M.-J. (2018). Media, technology use, and attitudes: Associations with physical and mental well-being in youth with implications for evidence-based practice. *Worldviews on Evidence-Based Nursing*, *15*(4), 304–312. https://doi.org/10.1111/wvn.12298

Zhang, G., Yang, X., Tu, X., Ding, N., & Lau, J. T. F. (2020). Prospective relationships between mobile phone dependence and mental health status among Chinese undergraduate students with college adjustment as a mediator. *Journal of Affective Disorders*, *260*, 498–505. https://doi.org/10.1016/j.jad.2019.09.047

Zhu, X., & Xiong, Z. (2022). Exploring association between social media addiction, fear of missing out, and self-presentation online among university students: A cross-sectional study. *Frontiers in Psychiatry*, *13*, 1-9. https://doi.org/10.3389/fpsyt.2022.896762

APPENDIX A:

Information leaflet and Informed consent document

(Original Study)

RESEARCH STUDY INFORMATION LEAFLET AND CONSENT FORM

DATE

2017-08-01

TITLE OF THE RESEARCH PROJECT

Predictors of psychological well-being amongst university students

PRINCIPLE INVESTIGATOR / RESEARCHER(S) NAME(S) AND CONTACT NUMBER(S):

Dr. Jacques Jordaan	0777920	051-4012890
Name of student/researcher	*Student number*	*Contact number*
Name of student/researcher	*Student number*	*Contact number*
Name of student/researcher	*Student number*	*Contact number*

FACULTY AND DEPARTMENT:

Humanities
Psychology

STUDYLEADER(S) NAME AND CONTACT NUMBER:

Dr. Jacques Jordaan
051-4012890

WHAT IS RESEARCH?

Research is something we do to find new knowledge about the way things and people work. We use research projects or studies to help us find out more about children and teenagers and the things that affect their lives, their schools, their families and their health. Research also helps us to find better ways of helping, or treating children who are sick. We do this to try and make the world a better place!

WHAT IS THE AIM / PURPOSE OF THE STUDY?

University students are unique as they serve as the future for their own families, communities and next generations. However, university students usually experience stress due to the academic and social demands and burdens they face during their studies. Being a university student entails that students need to take responsibility for their lives and to start facing the challenges that emerging adulthood hold for them. The psychological well-being of students is therefore crucial to enable them to deal with these various demands and challenges. Psychological well-being is a concept that is multi-dimensional and that includes special aspects such as optimism, loneliness, self-control,

happiness, sense of interests, anxiety, and being free of failures. Seeing that the psychological well-being of university students is so important it is essential to determine what variables are the best predictors of psychological well-being amongst university students. The proposed study can be valuable in the South African context for several reasons. Firstly, the findings of this study will contribute to the larger body of South African research which aims to understand psychological well-being amongst student populations. This study will also help to determine which variables are the best predictors of psychological well-being and can thus be used to inform future research and decide whether extra resources are needed to assist university students. Thus, the aim of this research study is to determine which variables are the best predictors of psychological well-being amongst university students. The following research questions will be investigated: Can the combination of adjustment, coping strategies, depression, emotional intelligence, life satisfaction, decision-making and self-esteem explain a significant percentage of variance in the psychological well-being of university students? Which set of predictors as well as the individual predictors explain the most significant percentage of variance in the psychological well-being of university students?

WHO IS DOING THE RESEARCH?

I am a lecturer in the Department of Psychology of the University of the Free State. I am conducting this study as I am interested in the psychological well-being of university students.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received approval from the Research Ethics Committee of UFS. A copy of the approval letter can be obtained from the researcher.

Approval number: *Insert approval number*

WHY ARE YOU INVITED TO TAKE PART IN THIS RESEARCH PROJECT?

The data will be obtained from a sample of approximately 800 university students (N=800) within the Faculty of the Humanities of the University of the Free State. The students will be approached during Psychology lectures and requested to voluntarily participate in the study. Students of all ages, ethnic groups, study years, languages or otherwise will be included to form part of the sample. Psychology students are chosen

as the researcher is a lecturer within the Psychology Department and have easy access to students studying Psychology although these students may have different majors.

WHAT IS THE NATURE OF PARTICIPATION IN THIS STUDY?

The participants will be requested to complete nine self-report questionnaires in their own time. The questionnaires will focus on psychological well-being and variables that have been found to be indicators of psychological well-being such as adjustment, depression, coping, self-esteem, decision-making, etc. The questionnaires should take about an hour and a half to complete, but the participants may complete the questionnaires in their own free time and provide the completed questionnaires back to the researcher.

CAN THE PARTICIPANT WITHDRAW FROM THE STUDY?

Participation in this study is on a voluntary basis and participants may withdraw from the study at any point in time. Participants who are willing to participate will be provided with the information sheet and the relevant questionnaires. All participants will have to provide informed consent before participating in this study.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

One benefit of participation is that the participants (students) will learn about research and research procedures. Another benefit is that students might learn more about certain concepts as some of the concepts that they study in Psychology will be measured through the self-report questionnaires. The identities of the participants will be kept anonymous and all information and inputs received from the participants will be kept confidential

WHAT IS THE ANTICIPATED INCONVENIENCE OF TAKING PART IN THIS STUDY?

Completing the questionnaires might be time consuming, but the researcher attempts to counter this by allowing the participants to complete the questionnaires in their own free time and to provide the questionnaires back once completed. A possible risk might be that participants might identify that they struggle with a certain aspect linked to psychological well-being and the researcher will ensure that such participants are referred to the necessary and relevant intervention services.

WILL WHAT I SAY BE KEPT CONFIDENTIAL?

All information and inputs received from the participants will be kept confidential. A coding system will be used to keep the identities of the participants anonymous and confidential. The identities of the participants will not be revealed to the public and the study will not be published in any article other than in an academic article for the purpose

of this research study. Only the researcher will have access to the data including possible future researchers who might want to use the data. However, these researchers will not be able to identify the participants due to the coding system and these researchers will also sign confidentiality forms.

HOW WILL THE INFORMATION BE STORED AND ULTIMATELY DESTROYED?

The completed questionnaires will be kept within a locked cabinet (to which only the researcher has access) for a period of five years. All digital documents will be password protected. After five years the physical questionnaires will be destroyed by shredding them. The researcher will make use of a coding system to ensure the anonymity of the participants.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICPATING IN THIS STUDY?

No financial rewards will be received for participation in this study. Participants will however learn more about research and the research process. This study might be time consuming due to the number of questionnaires involved in the study. Participants might identify from the questionnaires that they struggle with psychological well-being, but the researcher will ensure that these participants are referred for the appropraite interventions.

HOW WILL THE PARTICIPANT BE INFORMED OF THE FINDINGS / RESULTS OF THE STUDY?

If you would like to be informed of the final research findings, you are welcome to contact Dr. Jordaan at 051-4012890 or jordaanj1@ufs.ac.za. If you have any concerns or questions you are welcome to contact Dr. Jordaan.

Thank you for taking time to read this information sheet and for participating in this study.

CONSENT TO PARTICIPATE IN THIS STUDY

I,_____(participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet. I have had sufficient opportunity to ask questions and am prepared to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable). I am aware that the findings of this study will be anonymously processed into future research reports, journal publications and/or conference proceedings.

I agree to the recording of the *insert specific data collection method*.

I have received a signed copy of the informed consent agreement.

Full Name of Participant: _____

Signature of Participant:_____Date: _____

Full Name(s) of Researcher(s): _____

Signature of Researcher:_____Date: _____

APPENDIX B:

The Media and Technology Usage and Attitudes Scale

(MTUAS)

PsycTESTS

Media and Technology Usage and Attitudes Scale
Version Attached: Full Test

PsycTESTS Citation:
Rosen, L. D., Whaling, K., Carrier, L. M., Cheever, N. A., & Rokkum, J. (2013). Media and Technology Usage and Attitudes Scale [Database record]. Retrieved from PsycTESTS. doi: http://dx.doi.org/10.1037/t62672-000

Instrument Type:
Inventory/Questionnaire

Test Format:
This 60-item measure includes two parts: items assessing frequency of usage of various technologies and media, and items assessing attitudes toward technology and task switching. The media usage items are rated on either a 10-point frequency response scale (1 = never, 2 = once a month, 3 = several times a month, 4 = once a week, 5 = several times a week, 6 = once a day, 7 = several times a day, 8 = once an hour, 9 = several times an hour, 10 = all the time) or a 9-point numerical scale (1 = 0, 2 = 1–5, 3 = 51–100, 4 = 101–175, 5 = 176–250, 6 = 251–375, 7 = 376–500, 8 = 501–750, 9 = 751 or more). The attitudes items are rated on a 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree). Some items are reverse-scored, and each factor is computed using a mean score. The subscales can be used together or separately.

Source:
Rosen, L. D., Whaling, K., Carrier, L. M., Cheever, N. A., & Rokkum, J. (2013). The Media and Technology Usage and Attitudes Scale: An empirical investigation. Computers in Human Behavior, Vol 29(6), 2501-2511. doi: 10.1016/j.chb.2013.06.006,

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doi: http://dx.doi.org/10.1037/t62672-000

Media and Technology Usage and Attitudes Scale
MTUAS

Items

Usage, subscales

This scale includes 44 items which comprise 11 subscales: Smartphone Usage (9 items), General Social Media Usage (9 items), Internet Searching (4 items), E-Mailing (4 items), Media Sharing (4 items), Text Messaging (4 items), Video Gaming (3 items), Online Friendships (2 items), Online Friendships (2 items), Facebook Friendships (2 items), Phone Calling (2 items) and TV Viewing (2 items)

10-point frequency scale for items 1–40 (with scoring in parentheses):

Never (1)
Once a month (2)
Several times a month (3)
Once a week (4)
Several times a week (5)
Once a day (6)
Several times a day (7)
Once an hour (8)
Several times an hour (9)
All the time (10)

Please indicate how often you do each of the following e-mail activities on any device (mobile phone, laptop, desktop, etc.):

1. (E-mailing subscale) Send, receive and read e-mails (not including spam or junk mail).
2. (E-mailing subscale) Check your personal e-mail.
3. (E-mailing subscale) Check your work or school e-mail.
4. (E-mailing subscale) Send or receive files via e-mail.

Please indicate how often you do each of the following activities on your mobile phone:

5. (Text messaging subscale) Send and receive text messageson a mobile phone.
6. (Phone calling subscale) Make and receive mobile phone calls.
7. (Text messaging subscale) Check for text messages on a mobile phone.
8. (Phone calling subscale) Check for voice calls on a mobile phone.
9. (Smartphone usage subscale) Read e-mail on a mobile phone.
10. (Smartphone usage subscale) Get directions or use GPS on a mobile phone.
11. (Smartphone usage subscale) Browse the web on a mobile phone.
12. (Smartphone usage subscale) Listen to music on a mobile phone.
13. (Smartphone usage subscale) Take pictures using a mobile phone.
14. (Smartphone usage subscale) Check the news on a mobile phone.
15. (Smartphone usage subscale) Record video on a mobile phone.
16. (Smartphone usage subscale) Use apps (for any purpose) on a mobile phone.
17. (Smartphone usage subscale) Search for information with a mobile phone.
18. (Text messaging subscale) Use your mobile phone during class or work time.

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How often do you do each of the following activities?

19. (TV viewing subscale) Watch TV shows, movies, etc. on a TV set.
20. (TV viewing subscale) Watch video clips on a TV set.
21. (Media sharing subscale) Watch TV shows, movies, etc. on a computer
22. (Media sharing subscale) Watch video clips on a computer.
23. (Media sharing subscale) Download media files from other people on a computer.
24. (Media sharing subscale) Share your own media files on a computer.
25. (Internet searching subscale) Search the Internet for news on any device.
26. (Internet searching subscale) Search the Internet for information on any device.
27. (Internet Searching Subscale) Search the Internet for videos on any device.
28. (Internet searching subscale) Search the Internet for images or photos on any device.
29. (Video gaming subscale) Play games on a computer, video game console or smartphone BY YOURSELF.
30. (Video Gaming Subscale) Play games on a computer, video game console or smartphone WITH OTHER PEOPLE IN THE SAME ROOM.
31. (Video gaming subscale) Play games on a computer, video game console or smartphone WITH OTHER PEOPLE ONLINE.

Do you have a Facebook account? If the answer is "yes," continue with item 32; if "no", skip to the Attitudes subscales below. NOTE: The word "social media" may be substituted for Facebook in the question stem above and in items 32–34.

How often do you do each of the following activities on social networking sites such as Facebook?

32. (General social media usage subscale) Check your Facebook page or other social networks.
33. (General social media usage subscale) Check your Facebook page from your smartphone.
34. (General social media usage subscale) Check Facebook at work or school.
35. (General social media usage subscale) Post status updates.
36. (General social media usage subscale) Post photos.
37. (General social media usage subscale) Browse profiles and photos.
38. (General social media usage subscale) Read postings.
39. (General social media usage subscale) Comment on postings, status updates, photos, etc.
40. (General social media usage subscale) Click "Like" to a posting, photo, etc.

Please answer the following questions about your Facebook and other online friends. NOTE: In items 41 and 42 the words "social media" (or any specific social media site) may be substituted for Facebook.

9-point scale for items 37–40 (with scoring in parentheses:
0 (1)
1–50 (2)
51–100 (3)
101–175 (4)
176–250 (5)

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251–375 (6)
376–500 (7)
501–750 (8)
751 or more (9)

41. Facebook friendships subscale) How many friends do you have on Facebook?
42. (Facebook friendships subscale) How many of your Facebook friends do you know in person?
43. (Online friendships subscale) How many people have you met online that you have never met in person?
44. (Online friendships subscale) How many people do you regularly interact with online that you have never met in person?

Attitudes. Subscales

These subscales includes 16 items, which comprise four subscales: Positive Attitudes Toward Technology (6 items), Anxiety About Being Without Technology or Dependence on Technology (3 items), Negative Attitudes Toward Technology (3 items) and Preference for Task Switching (4 items)

5-point Likert scale for all items (with scoring in parentheses):

Strongly agree (5)
Agree (4)
Neither agree nor disagree (3)
Disagree (2)
Strongly disagree (1)

1. (Positive attitudes) I feel it is important to be able to find any information whenever I want online.
2. (Positive attitudes) I feel it is important to be able to access the Internet any time I want.
3. (Positive attitudes) I think it is important to keep up with the latest trends in technology.
4. (Anxiety/dependence) I get anxious when I don't have my cell phone.
5. (Anxiety/dependence) I get anxious when I don't have the Internet available to me.
6. (Anxiety/dependence) I am dependent on my technology.
7. (Positive attitudes) Technology will provide solutions to many of our problems.
8. (Positive attitudes) With technology anything is possible.
9. (Positive attitudes) I feel that I get more accomplished because of technology.
10. (Negative attitudes) New technology makes people waste too much time.
11. (Negative attitudes) New technology makes life more complicated.
12. (Negative attitudes) New technology makes people more isolated.
13. (Preference for task switching) I prefer to work on several projects in a day, rather than completing one project and then switching to another.
14. (Preference for task switching) When doing a number of assignments, I like to switch back and forth between them rather than do one at a time.

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15. (Preference for task switching) I like to finish one task completely before focusing on anything else.
16. (Preference for task switching) When I have a task to complete, I like to break it up by switching to other tasks intermittently.

*Scoring for item 15 is reversed with strongly agree = 1 and strongly disagree = 5.

APPENDIX C:

Depression, Anxiety and Stress Scale

(DASS)

Depression, Anxiety and Stress Scale (DASS)

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement. *The rating scale is as follows:*

0 Did not apply to me at all - NEVER

1 Applied to me to some degree, or some of the time – SOMETIMES

2 Applied to me to a considerable degree, or a good part of time – OFTEN

3 Applied to me very much, or most of the time - ALMOST ALWAYS

No	Statement	Did not apply to me at all	Applied to me to some degree	Applied to me to a considerable degree	Applied to me very much
01.	I found myself getting upset by quite trivial things	0	1	2	3
02.	I was aware of dryness of mouth	0	1	2	3
03.	I couldn't seem to experience any positive feeling at all	0	1	2	3
04.	I experienced breathing difficulty	0	1	2	3
05.	I just couldn't seem to get going	0	1	2	3
06.	I tended to over-react to situations	0	1	2	3
07.	I had a feeling of shakiness	0	1	2	3
08.	I found it difficult to relax	0	1	2	3
09.	I found myself in situations which made me so anxious I was most relieved when they ended	0	1	2	3
10.	I felt that I had nothing to look forward to	0	1	2	3
11.	I found myself getting upset rather easily	0	1	2	3
12.	I felt that I was using a lot of nervous energy	0	1	2	3
13.	I felt sad and depressed	0	1	2	3
14.	I found myself getting impatient when delayed in any way	0	1	2	3
15.	I had a feeling of faintness	0	1	2	3
16.	I felt I had lost interest in just about everything	0	1	2	3
17.	I felt I wasn't worth much as a person	0	1	2	3
18.	I felt I was rather touchy	0	1	2	3

19.	I perspired noticeably in the absence of high temperatures or physical exertion	**0**	**1**	**2**	**3**
20.	I felt scared without any good reason	**0**	**1**	**2**	**3**
21.	I felt that life wasn't worthwhile	**0**	**1**	**2**	**3**
22.	I found it hard to wind down	**0**	**1**	**2**	**3**
23.	I had difficulty in swallowing	**0**	**1**	**2**	**3**
24.	I couldn't seem to get any enjoyment out of the things I did	**0**	**1**	**2**	**3**
25.	I was aware of the action of my heart in the absence of physical exertion	**0**	**1**	**2**	**3**
26.	I felt down-hearted and blue	**0**	**1**	**2**	**3**
27.	I found that I was very irritable	**0**	**1**	**2**	**3**
28.	I felt I was close to panic	**0**	**1**	**2**	**3**
29.	I found it hard to calm down after something upset me	**0**	**1**	**2**	**3**
30.	I feared that I would be "thrown" by some trivial but unfamiliar task	**0**	**1**	**2**	**3**
31.	I was unable to become enthusiastic about anything	**0**	**1**	**2**	**3**
32.	I found it difficult to tolerate interruptions to what I was doing	**0**	**1**	**2**	**3**
33.	I was in a state of nervous tension	**0**	**1**	**2**	**3**
34.	I felt I was pretty worthless	**0**	**1**	**2**	**3**
35.	I was intolerant of anything that kept me from getting on with what I was doing	**0**	**1**	**2**	**3**
36.	I felt terrified	**0**	**1**	**2**	**3**
37.	I could see nothing to be hopeful about	**0**	**1**	**2**	**3**
38.	I felt that life was meaningless	**0**	**1**	**2**	**3**
39.	I found myself getting agitated	**0**	**1**	**2**	**3**
40.	I was worried about situations in which I might panic and make a fool of myself	**0**	**1**	**2**	**3**
41.	I experienced trembling	**0**	**1**	**2**	**3**
42.	I found it difficult to work up the initiative to do things	**0**	**1**	**2**	**3**

APPENDIX D:

General/Human Research Ethics Committee Approval Letter

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS UV

GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)

29-Nov-2021

Dear Mrs Natasha Jacoleen Eksteen

Application Approved

Research Project Title:
Media and technology usage, attitudes towards media, sex, and generational status as predictors of mental health amongst university students.

Ethical Clearance number:
UFS-HSD2021/1785/21

We are pleased to inform you that your application for ethical clearance has been approved. Your ethical clearance is valid for twelve (12) months from the date of issue. We request that any changes that may take place during the course of your study/research project be submitted to the ethics office to ensure ethical transparency. furthermore, you are requested to submit the final report of your study/research project to the ethics office. Should you require more time to complete this research, please apply for an extension. Thank you for submitting your proposal for ethical clearance; we wish you the best of luck and success with your research.

Yours sincerely

Dr Adri Du Plessis
Chairperson: General/Human Research Ethics Committee

Dr Adri du Plessis
Digitally signed by Dr Adri du Plessis
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APPENDIX E:

PLAGIARISM REPORT

Chapters only

ORIGINALITY REPORT

25%	19%	18%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	scholar.ufs.ac.za Internet Source	7%
2	Submitted to University of the Free State Student Paper	3%
3	Johanna Isabella van Tonder, Jacques Jordaan, Karel Esterhuyse. "Self-esteem, Interpersonal Communication Competence, and Media and Technology Usage as Predictors of Loneliness Among University Students", SAGE Open, 2023 Publication	2%
4	Siyanqoba Charity Makhosazana Duba, Jacques Jordaan. "Coping, perceived social support, stress, and age as predictors of correctional adjustment amongst South African incarcerated female offenders", Psychology, Crime & Law, 2023 Publication	1%
5	Codi Rogers, Jacques Jordaan, Karel Esterhuyse. "Coping, aggression, perceived social support and demographic variables as	1%